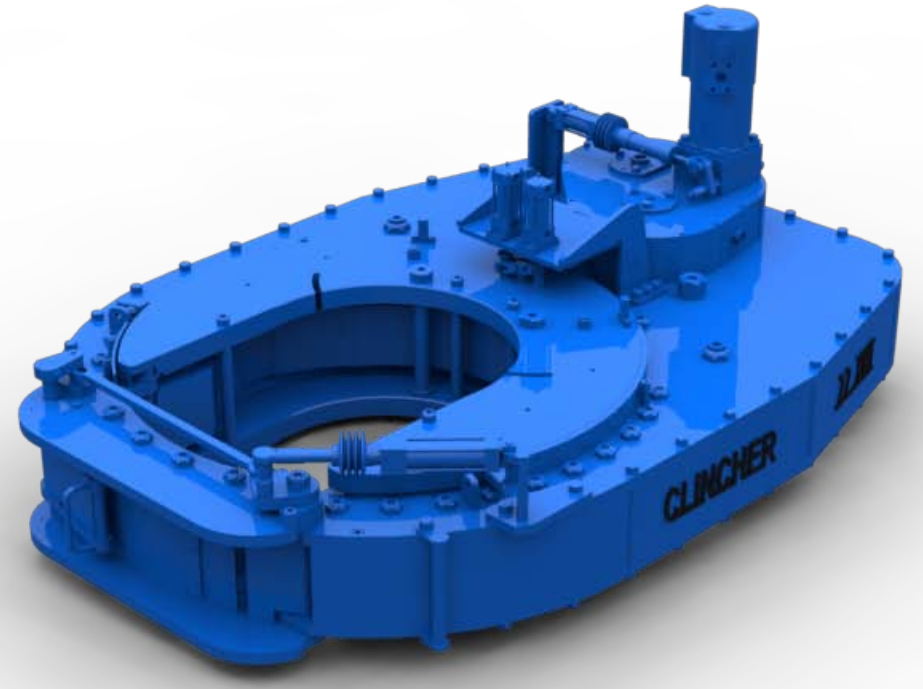
SUPERIOR
Manufacturing & Hydraulics

TECHNICAL MANUAL

22" CLINCHER® XHT TONG

100K FT/LBS



COVERS

TONG MODEL

CLE22000XHT-06

4225 Highway 90, East
Broussard, Louisiana 70518
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www.superior-manf.com

Published 01/2007

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The products described in this manual are covered by U.S. and foreign Patents and/or pending Patent Applications.

This manual is not a controlled document and is subject to revision without notice. To receive updates and insure you have access to the latest information concerning the 22" **CLINCHER®** XHT Tong, we request you complete this form and return the lower half to SUPERIOR Manufacturing and Hydraulics by mail or facsimile. Access to our manuals can also be acquired through our web site www.superior-manf.com. Select the tab '**CLINCHER®** Products', select the equipment from the list to get Specs page, select the tab 'Download Manual'.

Name: _____
Company: _____
Address: _____
Address: _____
City: _____ **State:** _____
Postal Code: _____ **Country:** _____
Telephone: _____ **Fax:** _____

Tong Model No.: _____ **Serial No.:** _____
Assembly Date: _____

- - - -

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22" CLINCHER® XHT TONG

REVISION TABLE

Section	*Page*	*Date*	*Description*

22" CLINCHER® XHT TONG
HAZARD WARNING

Nomenclature used in this manual:

WARNING	concerns an operating procedure or practice that, if not strictly observed, can result in injury to personnel or loss of life.
Caution	concerns an operating procedure or practice that, if not strictly observed, can result in damage to or destruction of equipment.
Note	concerns an operating procedure or practice that needs highlighting.

CLINCHER® Tongs are manufactured to provide a means of making up or breaking out high torque tubular connections. They utilize high pressure hydraulic fluid power which can cause the tong to move suddenly and with great force if the tong is not properly rigged up and operated. **CLINCHER®** Tongs contain remotely controlled rotating and reciprocating parts which can severely or fatally injure personnel who are operating, repairing, or near this equipment during its operation. **WARNING: Tongs are not to be operated by untrained personnel or personnel with diminished physical or mental capacity. No work of any type, including changing of dies, is to be carried out while the tong is connected to any hydraulic or electric power unit.**

CLINCHER® Tongs are heavy tools. They should be suspended from a secure, high strength 7/8" IWRC minimum diameter wire cable with a 31 ton minimum breaking strength. The wire cable should be hung as close to the center of the wellbore as possible, without interfering with drilling equipment operation, to allow the tong to be readily swung into the working position. Vertical position control should be achieved by means of a **CLINCHER®** hydraulically operated lift cylinder/spring hanger. **WARNING: Users must insure the entire lifting system used to move this equipment including forklifts, cranes, cables, rig mounting points, lift cylinders, slings, winches, pulleys, etc., are capable of handling the static weight of the tong plus any loads which could be transferred to it during handling.**

A 1 1/2" IWRC minimum diameter wire cable with a 114 ton minimum or better breaking strength, should be attached at a 90 degree angle to the tong and at the same level to insure proper readout of torque indicator. A SNUBBING LINE should always be attached even when an integral backup is in use to provide additional safety in the event of a backup slippage. **WARNING: Operating the Tong without locking a Backup on the tubular can cause dangerous and unexpected movement of the entire system causing severe equipment damage and causing personnel injury or death. Users must provide a means of safely controlling the tong movements in all directions when it is in use. Failure to account for its size, weight, movement and amount of torque developed could result in personnel injury or death.**

CLINCHER® Tongs utilize high pressure hydraulic fluids. Portions of the tong and backup, control valves, hydraulic lines and cylinders may contain high pressure fluid even when the power unit is de-energized and the fluid supply hoses are disconnected. During normal operation the temperature of the hydraulic fluids as well as hoses, piping, valves, etc., can rise to a level which can cause burns. **WARNING: Personal protective gear including safety glasses, face shields, protective gloves and protective clothing must be worn to guard against the hazards of high pressure fluids. Tight fitting clothing is required to prevent entanglement in rotating components. These tools should be serviced by thoroughly trained and qualified hydraulic technicians using procedures to safely insure hydraulic pressure is bled from these circuits.**

WARNING: Attempting to operate this unit with a power unit designed for open center valves will result in the power unit operating continuously at maximum pressure, will cause overheating, and may cause equipment failures possibly exposing personnel to high pressure, high temperature hydraulic fluid leaks.

The **CLINCHER®** Tong is equipped with a door interlock system which prevents tong rotation whenever the door is open. This system is to be tested before each mobilization and at every shift change. Should this system be determined to be inoperative, the tong is to be removed from service and tagged as ***in-operative*** until repairs are made. **CAUTION:** Operating the tong with the door in the open position could result in severe damage to the equipment and will void all manufacturer warranties. **WARNING: Operating the tong with the door open by means of a defective or bypassed door interlock system exposes the operator and nearby personnel to potentially fatal hazards.**

No attempt should be made to operate the **CLINCHER®** Tong for any purpose other than which it is intended. This system is capable of generating very large clamping forces and torsional loads which, if improperly applied or controlled, could result in damage to the tubular, to the tong, or could possibly result in injury or death of personnel. Do not attempt to operate the unit without correct dies and the proper size tubular being in the tong. See Section 3 for more information concerning the selection and use of dies. **CAUTION: Operating this equipment without the correct size, type, and orientation of dies can result in damage to the equipment or tubulars being handled.**

HYDRAULIC PRODUCT SAFETY

WARNING: Valve lever (spool) may "stick" (not center) under certain conditions allowing the hydraulic equipment to continue to operate and could cause serious injury, death or equipment failure.

VALVE SAFETY: Read and follow instructions carefully. Failure to observe instructions and guidelines may cause serious injury, death or equipment failure. A sticking valve (spool bind) may be caused by one or more of the following factors:

DIRTY OIL: Oil must be filtered to a minimum of 25 microns. Filters should be changed regularly - spin-on types after 50 hours of initial use and then after every two hundred fifty hours of use. Use of a condition indicator is recommended. Consult your tractor or implement owner's manual for filtration and changing recommendations for internal systems.

OIL REQUIREMENTS: Premium quality anti-wear type oil with a viscosity between 100 and 200 SSU at operating temperatures. Certain synthetic oils may cause spool seals to swell and the valve to stick. If in doubt, call CROSS Engineering.

IMPROPER HOOK UP OR MOUNTING: Always use the proper size fittings. Hook up "in" & "out" as noted on the valve body. Do not overtorque pipe fittings. Mounting surfaces should be flat and care should be used when tightening mounting bolts. Over-tightened bolts can cause spool bind and casting breakage. When hooking a valve in series, always use a power beyond sleeve. Consult your tractor or implement manual to make sure you have the proper quick disconnect line connected to the inlet of the remote valve.

MISAPPLICATION: Always use the proper valve for the job. CONVERTA, CD, CS or CA valves should never be used for metered heavy load lifting - loaders or similar applications. Use an open center valve for open center applications and a closed center valve for closed applications. If in doubt, check with your tractor dealer. Contact CROSS if the valve allows the hydraulic equipment to creep excessively.

MAINTENANCE: Make sure all bolts are tightened and torqued to the recommended specification. Bent or broken parts should not be used. Replace immediately. Always use exact replacements. Always protect valve spool from paint overspray.

Faulty quick disconnects can cause high back pressures and sticking spools. Check quick disconnects periodically to make sure they are functioning properly. If valve spool does not center or appears to stick, do not use!

PUMPS & MOTORS SAFETY:

A relief or bypass in your hydraulic system is necessary to prevent pump from breakage due to overpressurization. Use correct fittings and proper oil as noted in the technical service manual packed with each unit. Change oil as recommended by your implement or tractor manufacturer.

CYLINDER SAFETY:

Check clevis clearances before, during and after extending the cylinder and before using the cylinder under pressure to avoid possible injury, or bent or broken rods caused by binding. Never operatea cylinder above recommended pressures. Never use a cylinder as a safety device when trans-porting equipment.

PINHOLE LEAKS:

If you observe a pinhole leak, discontinue use of the component. If oil has penetrated your skin or contacted your eye, seek medical attention immediately!

GENERAL DESCRIPTION and APPLICATION

The **CLINCHER®** CLE22000XHT-06 Tong system is an "open throat" design which can handle API OCTG tubulars ranging from 8 5/8" to as large as 22" in diameter. This system features two (2) pivoting style jaws in the tong which encircle the pipe. Wrap-Around jaws and dies, combined with our low friction jaw technology and constant radial load cam system provide exceptional gripping capabilities with reduced pipe deformation, stress, and marking. Using our non-marking aluminum die system or **GRIT FACE™** dies in the Tong will now allow stainless steel corrosion resistant alloys (CRA) to be run as quickly and easily as a traditional tong runs conventional steel tubulars.

Notable Features and Benefits

Low Friction Jaws — increases cam angle efficiency to allow use of aluminum dies

Splined Die System — aligns the die with the tubular and more evenly distributes radial load, essentially wrapping the die around the tube reduces pipe stress, deformation, and minimizes marking

Constant Cam Angle — insures an adequate radial load is available regardless of relative rotation to enhance performance on undersized pipe

Die Retention Method — provides an enhanced method of preventing equipment damage and die loss if the pipe is inadvertently moved while the tong is still gripping the pipe

Self Adjusting Brake — eliminates need to manually adjust brake bands to compensate for normal wear

In addition to these unique features listed above, the **CLINCHER®** Tong and Backup System is also equipped with numerous standard features including:

Door Interlock — prevents tong ring gear rotation whenever the tong door is open but allows control and operation of the Backup and lift cylinder at all times

Encoder Adapter — accepts customer's turns encoder to signal to a torque/turn computer

Pressure Control Valve — adjustable pressure control valves allow the customer to limit the amount of pressure applied and torque developed

The features described above are covered by US and foreign patents or pending US and foreign patents.

Tong Application

After completing the make-up or break-out cycle, the jaws are opened by reversing the tong motor to drive the ring gear and cam surfaces in the opposite direction until the reversing pin contacts the ring gear shoulder. Springs are used to return the jaws to their fully open position.

CLINCHER® COMBO TONG

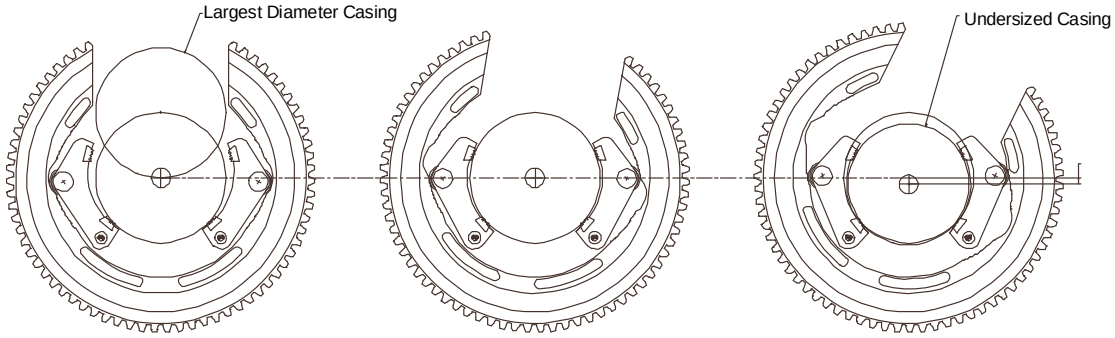
The **CLINCHER®** "Combo" Tong is a unique tool which accepts pivoting jaws for large diameter casing applications. When dressed with an optional jaw adapter[1], this tong also accepts sliding jaws for drill pipe and tubing applications.

Pivoting jaws provide large diameter gripping capabilities in a "narrow jaw" geometry allowing the overall width of the tong to be minimized. Pivoting jaws are circular segments which are pinned at one end. The wide angle between jaw inserts make them ideally suited for thin walled tubulars such as casing. When driven by the ring gear's cam, these jaws rotate about a pivot pin until the die inserts in the jaws contact the tubular. The geometry of these rotating jaws have limited ability to deal with tubulars which are somewhat smaller than the nominal jaw size because they must rotate beyond their normal design limits. This additional rotation can push the pipe's centerline off the tong's centerline causing eccentric rotation and questionable torque turn graphs.

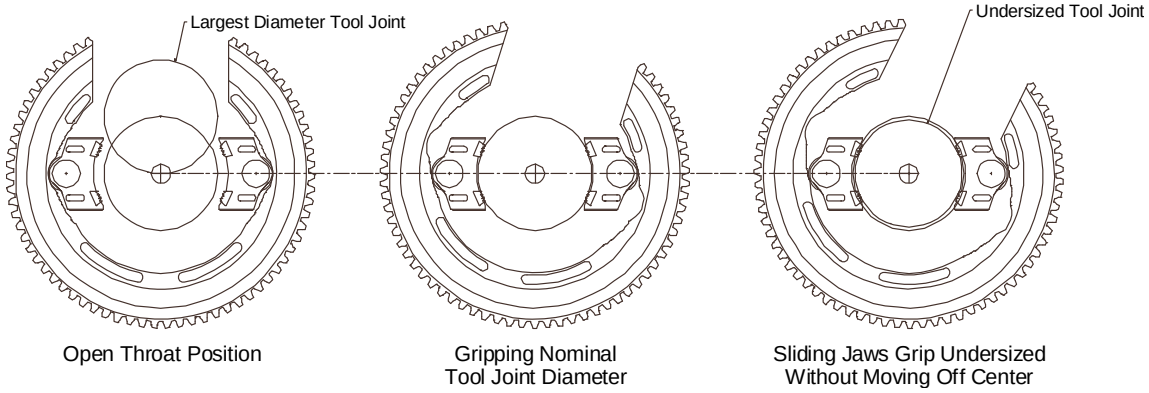
Sliding jaws move radially from the open position until they contact the pipe or tool joint. They are typically thicker than pivoting style joints, so tongs exclusively using this style jaw are typically larger than equivalent sized tongs using pivoting jaws. When dressed with dovetail dies in a "V" configuration, sliding jaws are capable of accommodating wide tool joint diameter variations under nominal jaw size. This Combo Tong features our constant radial load ring gear cam design[2] allowing the drill pipe jaws to grip tool joints as much as 1/2 inch smaller in diameter than the nominal drill pipe jaw size. These sliding jaws are available with splines[3] in standard and low friction[4] types for small diameter casing and tubing applications where the use of fine tooth steel dies is desirable. Applications requiring chrome alloys can be handled using **GRIT FACE™** Dies[5] or non-marking aluminum dies.

(1) US and foreign patents pending.
(2) US Patent 4,986,146; Canada 2,012,683
(3) US Patents 4,576,067 & 5,911,796
(4) US Patent 5,819,605; Canada 2,289,199; EU 98923644.3
(5) US Patent 6,378,399; other US & foreign patents pending

PIVOTING STYLE JAWS



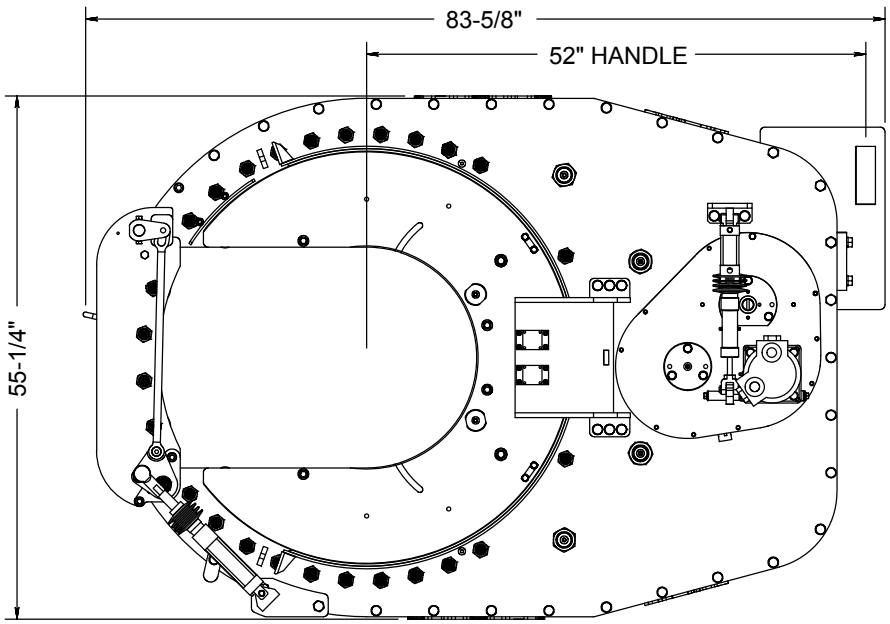
SLIDING STYLE JAWS

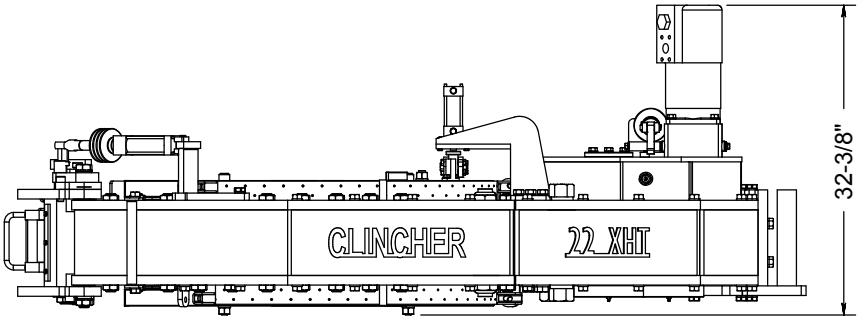

Largest Diameter Tool Joint
Undersized Tool Joint
Open Throat Position
Gripping Nominal Tool Joint Diameter
Sliding Jaws Grip Undersized Without Moving Off Center

SPECIFICATIONS

Maximum Torque	65,000 ft.lbs. / 88,128 Nm continuous rotation 100,000 ft.lbs. / 135,582 Nm max. make/break	**Standard Equipment:** - Door Interlock - Self Adjusting Brake - Lifting Bail
Maximum Operating Pressure	2,500 psi / 170 bar	
RPM @ 60 GPM/227 LPM: Manual		**Optional Equipment:** - Electronic Solenoid Dump Valve - Shipping Stand or Skid - Varying Outlets for Torque Turns Computer Sending Units
High / High	22 9,000 ft.lbs.	
High / Low	11 18,000 ft.lbs.	
Low / High	4.4 50,000 ft.lbs.	
Low / Low	2.2 65,000 ft.lbs. continuous rotation 100,000 ft.lbs. max. make/break	
Handle Length Tong	52" / 132 cm	
Overall Height	32-3/8" / 82.2 cm	
Overall Length	83-5/8" / 212.4 cm	
Overall Width	55-1/4" / 140.3 cm	
Weight / Tong less Jaws (approximate)	7,000 lbs. / 3,181 kg	
Tong Jaw Capacity	8 5/8" thru 22"	
Combo Tool Jaw Capacity (sliding style for drill pipe and drill collars). Note: Requires OPTIONAL COMBO ADAPTER	6 5/8" thru 10 1/4"	

Operates using Dovetail Strip Dies, Steel Tooth Wrap Around Dies, **GRIT FACE™** Wrap Around Dies, and Aluminum Wrap Around Dies.





22" TONG DIMENSIONS

ASSEMBLY NO. CLE22000XHT-06

SUPERIOR Manufacturing & Hydraulics
4225 HWY. 90 EAST
BROUSSARD, LA 70518
(318) 837-8847

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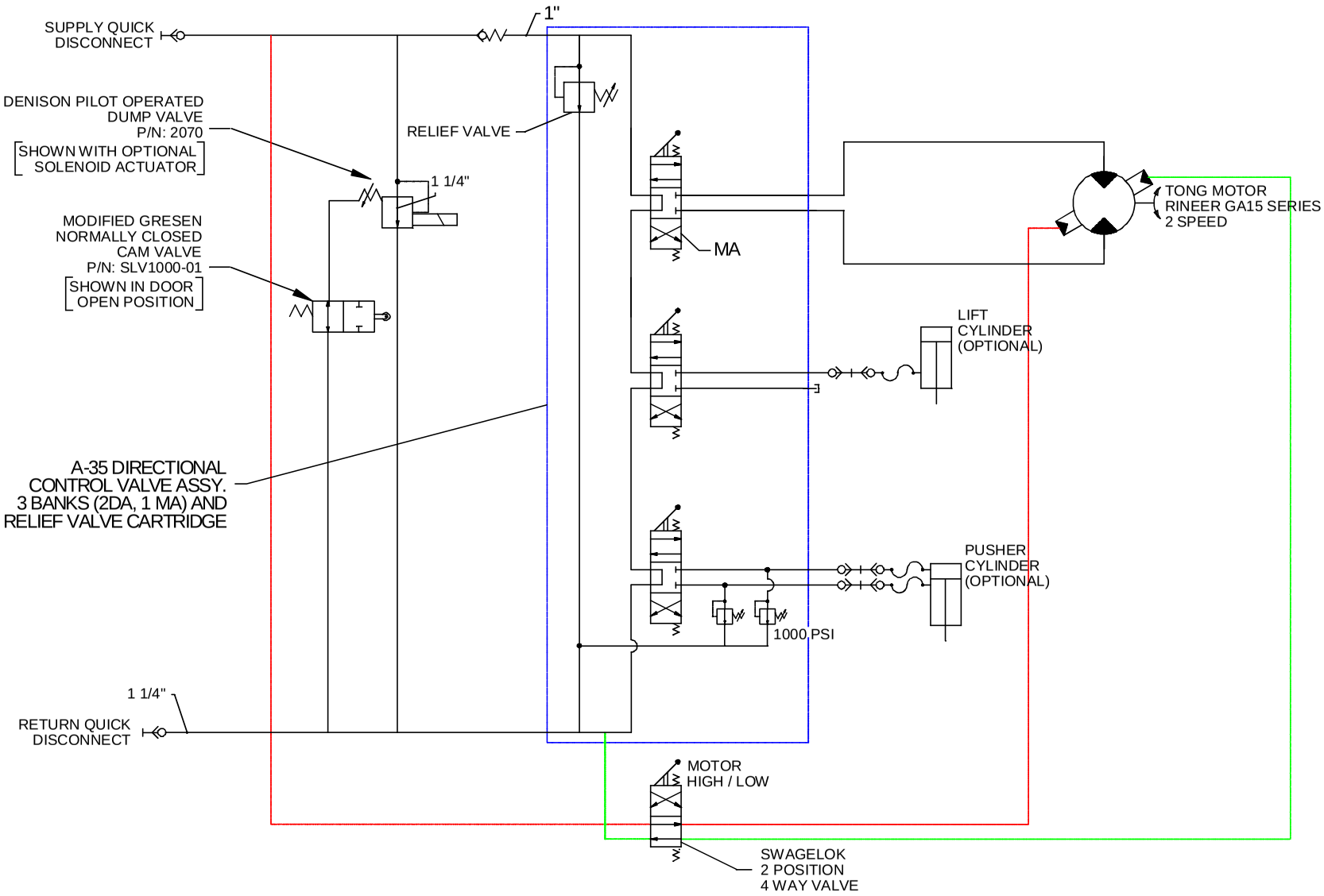
SUPPLY QUICK DISCONNECT
1"
DENISON PILOT OPERATED DUMP VALVE P/N: 2070
[SHOWN WITH OPTIONAL SOLENOID ACTUATOR]
RELIEF VALVE
1 1/4"
MODIFIED GRESEN NORMALLY CLOSED CAM VALVE P/N: SLV1000-01
[SHOWN IN DOOR OPEN POSITION]
MA
TONG MOTOR RINEER GA15 SERIES 2 SPEED
LIFT CYLINDER (OPTIONAL)
A-35 DIRECTIONAL CONTROL VALVE ASSY. 3 BANKS (2DA, 1 MA) AND RELIEF VALVE CARTRIDGE
PUSHER CYLINDER (OPTIONAL)
1000 PSI
1 1/4"
RETURN QUICK DISCONNECT
MOTOR HIGH / LOW
SWAGELOK 2 POSITION 4 WAY VALVE

BASIC HYDRAULIC SCHEMATIC

CLE26000 CASING TONG
CLE22000XHT-06 TONG

NOTE: NUMEROUS FITTINGS, HOSES, & NIPPLES ARE NOT ILLUSTRATED IN THIS SCHEMATIC

SUPERIOR Manufacturing & Hydraulics
4225 HWY. 90 EAST
BROUSSARD, LA 70518
(318) 837-8847

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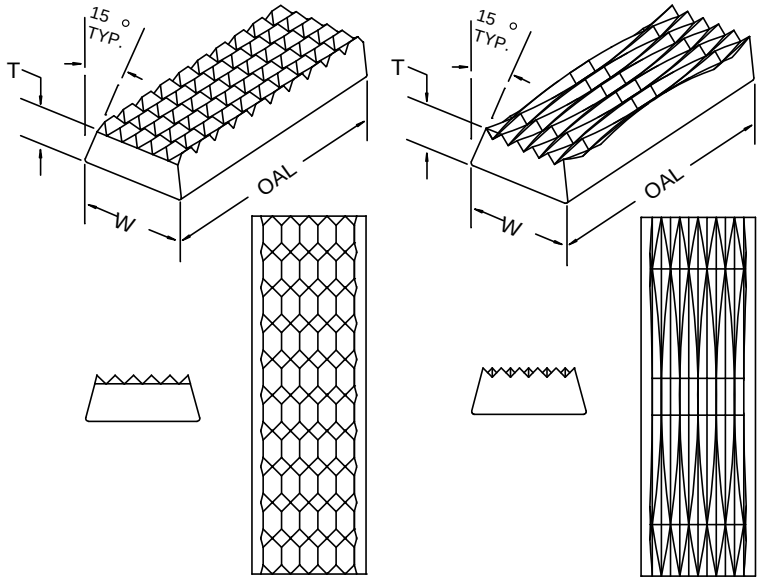
CLINCHER® DIES

Many **CLINCHER®** Tongs and Backups utilize jaws and/or adapters which accept Dovetail Inserts (AKA Pencil Dies or Strip Dies) to effectively grip tubulars. Jaw systems and jaw adapters are also available which accommodate Wrap-Around Fine Tooth Steel Dies, **GRIT FACE™** Dies and Aluminum Dies.

The appropriate jaws, die adapters and dies required for a specific tubular OD are also described in this section of the manual.



STRAIGHT TOOTH **DIAMOND TOOTH**

Note: Diamond Tooth Dies are used when a more aggressive bite is required.

Thickness	Width	OAL	P/N Straight Tooth	P/N Diamond Tooth
5/16	5/8	3 1/2	*	*
5/16	5/8	3 7/8	DTI4052	*
5/16	5/8	4 1/2	DTI4002	*
3/8	5/8	3 1/2	DTI4030	*
3/8	5/8	3 7/8	DTI4051	*
3/8	5/8	4 1/2	DTI4001	*

Thickness	Width	OAL	P/N Straight Tooth	P/N Diamond Tooth
17/32	5/8	3 1/2	DTI4031	*
17/32	5/8	3 7/8	DTI4053	*
17/32	5/8	4 1/2	DTI4003	*
5/8	5/8	3 1/2	DTI4032	*
5/8	5/8	3 7/8	DTI4054	*
5/8	5/8	4 1/2	DTI4004	*
11/16	5/8	3 7/8	DTI4055	*
11/16	5/8	4 1/2	DTI4005	*
3/8	1	3 7/8	DTI1505	*
3/8	1 1/4	3 7/8	DTI1614	*
3/8	1 1/4	5	DTI1610	*
7/16	1 1/4	3 7/8	DTI1612	DTI1612D
7/16	1 1/4	5	DTI1617	DTI1617D
1/2	1 1/4	3 7/8	DTI1601	DTI1601D
1/2	1 1/4	5	DTI1602	DTI1602D
9/16	1 1/4	3 7/8	DTI1622	DTI1622D
9/16	1 1/4	5	DTI1623	DTI1623D
5/8	1 1/4	3 7/8	DTI1632	DTI1632D
5/8	1 1/4	5	DTI1633	*
11/16	1 1/4	3 7/8	DTI1642	*
11/16	1 1/4	5	DTI1646	*
3/4	1 1/4	3 7/8	DTI1651	*
3/4	1 1/4	5	DTI1693	*
3/4	1 1/4	5 7/8	DTI1662	DTI1662D
13/16	1 1/4	3 7/8	DTI1661	*
13/16	1 1/4	5	DTI1664	*
7/8	1 1/4	3 7/8	DTI1671	*
7/8	1 1/4	5	DTI1673	*
1	1 1/4	3 7/8	DTI1691	*
1	1 1/4	5	DTI1697	*

* Available upon request.

CLINCHER® WRAP AROUND DIES

CLINCHER® Wrap Around Dies are available in three types:

Fine Toothed Steel Dies: for low to ultra high torque applications on carbon steel tubulars including tubing, casing, and drill pipe

Smooth Faced Aluminum Dies: for low to moderate torque applications on fiberglass and corrosion resistant alloy (stainless steel) tubulars

GRIT FACE™ Dies: for low to high torque applications on fiberglass and corrosion resistant alloy (stainless steel) tubulars where the use of steel dies is prohibited as well as on carbon steel tubulars where reduced marking is desired

CLINCHER® Dies are designed to match the OD of the tubing, casing, coupling, or accessory being made up or broken out. Each die is stamped on the top or side to identify its size. Using Fine Toothed Steel Dies which are slightly larger than the tubular is acceptable provided the difference in diameters is less than 3/32" (0.093"). Aluminum and **GRIT FACE™** Dies should be matched with the specific tubular diameters required. **Note:** The use of improperly sized dies can result in reduced torque capacity, increased pipe marking, and reduced die life.

CAUTION: Do not attempt to grip tubular diameters which are larger than the dies being used. Failure to observe this precaution can result in damage to the tubular or tong jaws.

In emergencies where correct die sizes are unavailable, some operators have successfully used two different sizes of dies to accommodate unusual, nonstandard diameters.

CLINCHER® Wrap Around Dies are manufactured in specific diameters to match standard tubing and casing diameters, API coupling diameters, selected work string connection diameters and certain commonly used premium connection coupling diameters. **CLINCHER®** Wrap Around Dies should not be used on tubulars which are larger than the nominal die size. Steel Toothed Dies can be used on tubulars which are no smaller than 3/32" (0.093") less than the nominal die size. Aluminum and **GRIT FACE™** Dies should be matched with the specific tubular diameters required.

Note: Fine Toothed Steel Dies are normally stocked in our Broussard, Louisiana facility. A partial listing of commonly manufactured sizes is shown below. Aluminum and **GRIT FACE™** Dies are normally made to order although a limited range of sizes and small quantities may be available from stock. Contact SUPERIOR Manufacturing & Hydraulics for information concerning availability of stock and special die sizes.

Gripping Diameter as a Function of Die Thickness

Nominal Jaw and Dovetail Die Adapter Size	Jaw Assembly Part Number assembly consists of two jaws c/w pins and rollers	dovetail jaw part number	nominal jaw size	Jaw gripping range when dressed with 1 1/4" wide 5" long dovetail strip dies with thickness of:							<<*dovetail die thickness* <<*pipe application*
				0.8125 13/16 undersized	0.75 3/4 undersized	0.6875 11/16 undersized	0.625 5/8 undersized	0.5625 9/16 undersized	**0.5 1/2 STANDARD**	0.4375 7/16 oversized	
22 x 10.750	CJDT22-10750	22-10750-L & 22-10750-R	10.750	10.125	10.250	10.375	10.500	10.625	**10.750**	10.875	maximum pipe OD for die & jaw
				9.625	*9.750*	*9.875*	*10.000*	*10.125*	***10.250***	*10.375*	*minimum undersized condition*
22 x 11.875	CJDT22-11875	22-11875-L & 22-11875-R	11.875	11.250	11.375	11.500	11.625	11.750	**11.875**	12.000	maximum pipe OD for die & jaw
				10.750	*10.875*	*11.000*	*11.125*	*11.250*	***11.375***	*11.500*	*minimum undersized condition*
22 x 13.375	CJDT22-13375	22-13375-L & 22-13375-R	13.375	12.750	12.875	13.000	13.125	13.250	**13.375**	13.500	maximum pipe OD for die & jaw
				12.250	*12.375*	*12.500*	*12.625*	*12.750*	***12.875***	*13.000*	*minimum undersized condition*
22 x 13.625	CJDT22-13625	22-13625-L & 22-13625-R	13.625	13.000	13.125	13.250	13.375	13.500	**13.625**	13.750	maximum pipe OD for die & jaw
				12.500	*12.625*	*12.750*	*12.875*	*13.000*	***13.125***	*13.250*	*minimum undersized condition*
22 x 14	CJDT22-14000	22-14000-L & 22-14000-R	14.000	13.375	13.500	13.625	13.750	13.875	**14.000**	14.125	maximum pipe OD for die & jaw
				12.875	*13.000*	*13.125*	*13.250*	*13.375*	***13.500***	*13.625*	*minimum undersized condition*
22 x 16	CJDT22-16000	22-16000-L & 22-16000-R	16.000	15.375	15.500	15.625	15.750	15.875	**16.000**	16.125	maximum pipe OD for die & jaw
				14.875	*15.000*	*15.125*	*15.250*	*15.375*	***15.500***	*15.625*	*minimum undersized condition*
22 x 18.000	CJDT22-18000	22-18000-L & 22-18000-R	18.000	17.375	17.500	17.625	17.750	17.875	**18.000**	18.125	maximum pipe OD for die & jaw
				16.875	*17.000*	*17.125*	*17.250*	*17.375*	***17.500***	*17.625*	*minimum undersized condition*
22 x 18.625	CJDT22-18625	22-18625-L & 22-18625-R	18.625	18.000	18.125	18.250	18.375	18.500	**18.625**	18.750	maximum pipe OD for die & jaw
				17.500	*17.625*	*17.750*	*17.875*	*18.000*	***18.125***	*18.250*	*minimum undersized condition*
22 x 20	CJDT22-20000	22-20000-L & 22-20000-R	20.000	19.375	19.500	19.625	19.750	19.875	**20.000**	20.125	maximum pipe OD for die & jaw
				18.875	*19.000*	*19.125*	*19.250*	*19.375*	***19.500***	*19.625*	*minimum undersized condition*
22 x 22	CJDT22-22000	22-22000-L & 22-22000-R	22.000	21.375	21.500	21.625	21.750	21.875	**22.000**	22.125	maximum pipe OD for die & jaw
				20.875	*21.000*	*21.125*	*21.250*	*21.375*	***21.500***	*21.625*	*minimum undersized condition*
***CLINCHER®** part number for Straight Tooth Dovetail Dies>>*				*DTI1664*	*DTI1693*	*DTI1646*	*DTI1633*	*DTI1623*	***DTI1602***	*DTI1617*	
***CLINCHER®** part number for Diamond Toothed Dovetail Dies>>*				*Note 1*	*Note 1*	*Note 1*	*Note 1*	*DTI1623D*	***DTI1602D***	*DTI1617D*	

Note 1: This die available upon request.

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ASSEMBLY TORQUE REQUIREMENTS

FASTENER LUBRICATION AND MAKE UP TORQUE REQUIREMENTS

Most bolts, nuts, and other threaded components are to be lubricated with Never-Seez or equivalent before assembly. Certain fasteners are to be assembled using permanent or removable Lok-Tite as indicated in the assembly instructions. All tapered pipe threads are to be treated Lok-Tite 542 or equivalent sealing compound to prevent leakage.

CAUTION: Do not use teflon tape. Improper application of teflon tape can cause joint failures. Teflon tape can release large particles which can plug small passages in hydraulic equipment.

All standard fasteners used in **CLINCHER®** products are to be GRADE 8 or better. DO NOT SUBSTITUTE lesser grades of fasteners. All fasteners are to be made up to the torque charted below. Failure to properly assemble these fasteners can result in their loss, product malfunction, and ultimately result in situations where personnel can be exposed to dangerous situations.

LUBRICATION STANDARDS

Bearings and gears must be lubricated to minimize friction, cool, exclude foreign matter, and prevent corrosion. **CLINCHER®** recommends using Texaco Marfak MP 2 or equivalent for all grease zerts, roller bearings and bushings. Gears located within the clutch housing or between the tong plates are to be heavily lubricated using PLUSCO 855 or equivalent.

Reference Lubrication Specifications on following page.

IMPORTANT NOTE: Grease all zerts located on the top and bottom of the tong. Certain dumbell roller shafts including the brake shaft and the ones located above the tong legs can only be lubricated from one side. Rotate the ring gear and cage plate assembly to visually confirm grease is being displaced on both ends of each dumbell roller assembly.

TONG FASTENERS		
Size	***Application***	***Torque***
1/4 - 20 NC	door switch mounting bolts, door support strip	10 ft lbs
3/8 - 16 NC	shift assembly, low gear housing cover, door latch pivot pin, jaw bolts	33 ft lbs
1/2 - 13 NC	idler race, upper bearing caps, motor mount, cage plate stop & jaw spring bolts, door plates to door latch, brake bands	93 ft lbs
5/8 - 11 NC	top and bottom tong plates, bearing caps	180 ft lbs
3/4 - 10 NC	short idler shaft, cage plate spacer bolts & ring gear stop	317 ft lbs
7/8 - 14 NF	cam follower nuts	63 ft lbs
1 - 8 NC	bail bolts	100 ft lbs
1 - 12 NF	dumbell rollers, door dumbell rollers, door pivot shaft	*
1 1/2 - 12 NF	idler shafts	1,200 ft lbs
1 3/4 - 5	short idler shaft	2,200 ft lbs

* Tighten until all slack is removed, but dumbell roller is still free to rotate by hand.

LUBRICATION SPECIFICATIONS

Use an EP synthetic grease that meets or exceeds the following specifications: (Used in tong case)

Type	High Temp MP
NLGI Consistency Grade	1
Color	Medium Green
Lithium Complex Soap, wt%	Non Soap
Serv. Temperature	0 Deg. F – 450 Deg. F
Base Oil Viscosity: @ 100º F @ 200º F	1300 SUS 89 SUS
Viscosity Index	77
Penetration, dmm Worked *ASTM D 217*	325-340
Dropping Point, ºF *ASTM D 566*	500 ±
Rust Protection, 5% SSW	N/A
Water Washout %wt loss @ 175ºF	N/A
Timken, OK Load, lbs	50
Bomb Oxidation 100 hrs @ 210ºF, psi drop	N/A
Applications	High & Low Speed Bearings, Wheel Bearings, Pumps, Gears, Lubrication

Use an EP synthetic grease that meets or exceeds the following specifications: (Used as bearing grease)

Type	N/A
NLGI Consistency Grade	2
Color	Blue
Lithium Complex Soap, wt%	14
Serv. Temperature	N/A
Base Oil Viscosity: @ 40ºC, cSt *ASTM D 445* @ 100ºC, cSt	150 14.5
Viscosity Index	N/A
Penetration, dmm Worked, 60X *ASTM D 217*	280
Dropping Point, ºF *ASTM D 2265*	450+
Rust Protection, 5% SSW *ASTM D 5969*	Pass
Water Washout %wt loss @ 175ºF *ASTM D 1264*	6.8
Timken, OK Load, lbs *ASTM D 2509*	45
Bomb Oxidation 100 hrs @ 210ºF, psi drop *ASTM D 942*	5 max
Applications	Industrial application where a high temperature/multipurpose extreme pressure grease is needed, Trailers

Use a premium quality hydraulic fluid that meets or exceeds the following specifications:

Humble Hydraulic H		68
ISO Viscosity Grade		68
Base Oil Viscosity: *ASTM D 445*	cSt @ 40ºC cSt @ 100ºC	65.0 8.5
Viscosity Index – *ASTM D 2270*		95
Pour Point – *ASTM D 97*		-9
Flash Point – *ASTM D 92*	C(ºF)	222 (432)
Demulsibility – *ASTM D 1401*		41/39/0 (20)
Vickers 104C (IP281)		Pass
Vickers M-2950-S		Quality Level
Vickers I-286-S		Quality Level
TOST – *ASTM D 943*		2000+

OPERATIONAL INSTRUCTIONS

Suspension

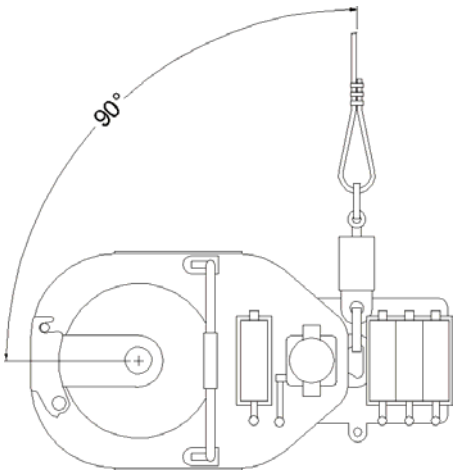
A) Tong should be hung by 7/8" IWRC minimum O.D. wire cable with a 31 ton minimum breaking strength. It should be hung as close to the center of the drill rotary without interfering with operation of drill string and lifting equipment. It is recommended the operator make use of the **CLINCHER®** Lift Cylinder. The **CLINCHER®** Lift Cylinder incorporates a hydraulic cylinder and manual lift spring. The hydraulic cylinder portion is used to assist in the raising and lowering of the tong and backup while the spring allows for movement during make-up and break-out.

WARNING: The suspension system must allow the tong to easily move down a distance equivalent to the thread make-up length. If significant resistance is encountered the suspension system may be subject to load which could cause its failure, damage equipment, or expose personnel to severe or fatal hazards.

B) Assure that the tong is suspended in level manner. Both tong and backup must be level at the point they contact the tubular. Using adjustment screws and slots in rigid hanger assembly, adjust tong so that it hangs level on horizontal axis and is parallel to tubular on vertical axis. If using 3 point bridle, use turnbuckles to adjust tong so it hangs level.

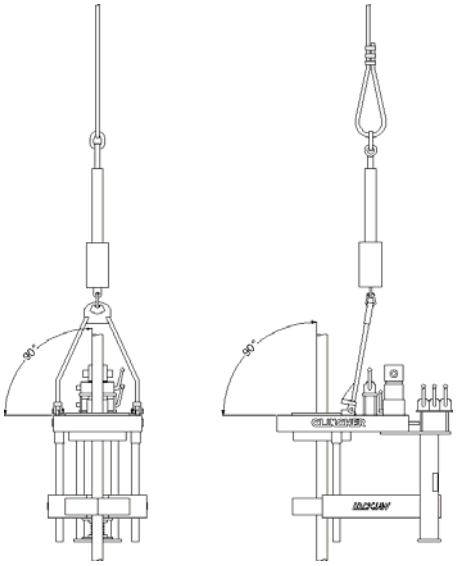
C) Make certain that floor space is adequate to maneuver tong on and off pipe. The space must be clear of obstructions to allow safe and unrestricted operation.

D) Attached 1 1/2" IWRC minimum wire cable with a 114 ton minimum or better breaking strength, as a tong back up line at 90 degree angle to tong and at the same level to insure proper readout of torque indicator. You should always have snubbing line attached. Use of a integral hydraulic backup is safer than manual backup, but operators should maintain additional safety of snubbing line to prevent injury in case of hydraulic failure or the failure of operator to have backup properly applied to tubular. This equipment generates extreme torque and should be used with caution.



TYPICAL SNUB LINE INSTALLATION

NOTE: SNUB LINE IS PERPENDICULAR TO AXIS OF TONG



TYPICAL TONG INSTALLATION

NOTE: TONG IS PERPENDICULAR TO TUBING

Jaw and Wrap Around Die Installation

A) Be sure all power to unit is off, and power unit is shut down. Disconnect hydraulic hoses.

B) Determine O.D. of tubular to be made-up or broken-out. Use proper dies to bite O.D. of tubular and insert as follows: Remove jaw assembly from tong. Remove upper die retainer clips. Insert die into jaw. Reinstall clips and clip retainer bolts. Reinstall jaws into cage plates, install pivot pins and reattach springs.

OPERATIONAL INSTRUCTIONS

Hydraulic Lines

A) Be sure all power to unit is off, and power unit is shut down.

B) Always inspect hoses prior to installation for abrasions, kinks, and other visible damage.

C) Install hydraulic supply hose and hydraulic return hose between tong and hydraulic power unit. Be advised that the standard installation on **CLINCHER®** tong calls for 1" Hydraulic Supply hose and 1-1/4" Hydraulic Return hose. A 3/4" case drain hose is provided for systems equipped with a case drain line. The differing hose sizes eliminate the possibility of attaching the wrong hose to the wrong outlet while at the same time reducing back pressure in your hydraulic system.

Tong Operation

A. Insure proper dies are installed. Connect hydraulic hoses, verify reservoir is full of hydraulic fluid and insure suction valve is open.

B. Open bypass valve to hydraulic system, then check to make sure all hose connections are secure and hydraulic system is free of leaks.

C. Be certain door is completely closed before operation to insure safe operation. The **CLINCHER®** CLE22000XHT-05 is equipped with a door switch, which prevents operation of the tong when door is even partially open.

D. Use power unit to start up procedure as outlined in your owners manual supplied by the manufacturer.

E. In the event hoses are not tightened securely, possible failures to hydraulic system can occur.

   1) If pressure supply hoses are restricted or flow is blocked, pressure will increase in the hydraulic power unit, resulting in increased RPM in the power unit.

   2) If return line hoses are restricted or flow is blocked, pressure will increase in the hydraulic power unit and the hydraulic system to the tong itself, resulting in the tong motor increasing to maximum pressure and possible motor seal failure.

F. After completion of A through E restart the power unit and allow engine to idle for approximately 10 minutes. Slowly close bypass valve to allow circulation of hydraulic oil through tong and hoses. Place shifting lever into low and rotate several times. Repeat in reverse. If correct jaw-die combination is installed, the unit is now ready to run pipe.

G. Adjust height of tong to proper height, using the control valve located in the middle of the valve bank assembly.

H. Stand in the normal operators position, insert the locking pin into the rear cage plate hole (on operators side). This pin allows ring gear to rotate clockwise (make-up) and engage the can to close jaws on pipe.

I. Rotate ring gear clockwise by pushing motor control lever on the front valve bank assembly forward until jaws lock on pipe and continue to rotate until desired amount or torque is applied.

J. After correct amount of torque specific to that connection has been applied, release tong jaws by pulling back on motor control lever until jaws release and throat in cage plate is aligned with door opening. Open door.

K. High and low motor is adjusted by **use of shifting valve located to the left side of the tong**.

Tong Operation

After completing the makeup or breakout cycle the jaws are opened by reversing the tong motor to drive the ring gear and cam surfaces in the opposite direction until the reversing pin contacts the ring gear shoulder. Springs are used to return the jaws to their fully open position.

Door Operation

Tong operation depends on door being fully closed and latched. If the door is not properly closed and latched, the door switch will vent the dump valve, not allowing pressure to build. **WARNING: Do not override bypass door switch. This can cause serious injury or damage to the tong. Do not operate tong with door open or unlatched.**

MAINTENANCE INSTRUCTIONS

CLINCHER® recommends that owners of **CLINCHER®** Hydraulic Power Tongs and accessories adapt a regularly scheduled maintenance program. Implementation of this type of program offers several benefits. First you decrease the possibility of anyone being harmed by the equipment. Second, you increase the life of your equipment. And third, you may find a problem before it escalates to a costly repair or down time on the job.

A major inspection (described at the end of this section) should be carried out if equipment is suspected to have been damaged during transit, has suffered some form of significant overloading/impact during operation, or is to be mobilized to a remote location where maintenance operations are difficult to carry out.

It is strongly recommended that the **CLINCHER®** Tong be fully function tested upon installation, prior to being put into service.

HYDRAULIC SYSTEMS AND COMPONENTS

Hydraulic systems and components are designed for specific use in the oil and gas industry. The hydraulic pressure rating for this equipment can be as high as 3000 psi. Therefore, it is VITALLY IMPORTANT that prior to carrying out any work on any portion of the hydraulic system that you familiarize yourself with the hydraulic schematics. **WARNING**: No work of any type is to be carried out while the tong is connected to any hydraulic power supply. It is recommended that you fully disconnect all hydraulic lines supplying power to the hydraulic system and utilize a method of isolation or lockouts on the control systems. Always take precautions when bleeding down any residual system pressure by ensuring the return (1 1/4") hydraulic line is disconnected last and that all control levers are in the neutral or open center position.

While residual fluids will be minimal in quantity, it is VITALLY IMPORTANT that all residual fluids are secured in a suitable container taking the necessary precautions to safeguard and protect against potential environmental contamination.

ROUTINE MAINTENANCE

Cleaning - Upon return from each and every job:

A) Pre-wash unit to remove majority of dirt and grease build up as to allow removal of dies, and inspection of overall condition of unit.

B) Remove and inspect dies from tong. Note any missing or damaged die retainers and/or die retainer bolts.

C) Remove side jaws from tong and inspect side jaw for missing or broken parts, damaged splines, broken ears (locking hooks on front portion of side jaws).

D) Clean and inspect side jaws, jaw pins, jaw rollers for damage or excessive wear. Lubricate pins and rollers, and reinstall in tong.

E) Inspect hanger and all hoses for wear, replace as necessary.

F) Inspect hanger assembly to assure all parts are returned and in operating condition. (*i.e.* H-Plates, spring, leg springs, leg spring caps and pins)

G) Replace jaw pins and rollers in tong.

H) Lubricate tong's cam followers (upper and lower), dumbell roller shafts and door dumbbell roller shafts (upper and lower zerts), door shaft, idler gear shafts, and re-pack tong body cavity.

I) Install dies of a size needed for testing purposes, and attach hydraulic power unit to tong. Before energizing power unit make certain no one is working on tong and all tools and parts are removed from the tong.

J) With the proper dies installed in the tong, place reversing pin into the make-up position, set tong into low gear and operate tong through several cycles of locking, biting, and torqueing to required torque. Change reversing pin to break-out position and repeat. Repeat same procedure in high gear.

   Note: Torque developed in high gear is considerably less than torque developed in low gear.

K) Test door interlock system by opening door slightly with tong rotating. (Remove test mandrel for this procedure.) The tongs rotation should stop. If tong rotation fails to stop, close door, cease rotation, deactivate power unit, and inspect door interlock switch for damage. Insure that adjustment collar is oriented to allow wheel of door switch to fit into recess on collar.

   Warning: If door switch system is not functioning properly tong must not be used.

L) Re-inspect tong hydraulic system for leaks.

M) If at this time the unit is functioning as intended, replace all covers and grease splines in tong, tape or grease spools on control valves (to prevent paint from adhering to polished spool surface), prime and paint unit for storage.

MAINTENANCE INSTRUCTIONS

RECOMMENDED LUBRICATION SCHEDULE
PERFORMED AFTER COMPLETION OF EACH JOB

HYDRAULIC TONG

A) Cam followers: upper and lower (all)
B) Dumbell roller shafts: upper and lower (all)
C) Door shaft and door dumbell roller shafts: upper and lower (all)
D) Idler shafts (5)
E) Pinion Gear
F) Secondary Gear
F) Re-pack tong cavity
G) Jaw rollers and pins. Remove jaw pins and rollers, clean and lubricate with gear grease.
H) Inspect hydraulic fluid for foreign material and contaminants. Filter or replace. You must filter or replace entire system including power unit tank and lines along with tong to insure all contaminants are removed.

ANNUAL MAJOR MAINTENANCE

INSPECTION AND REPAIR

Routine preventative maintenance will reduce risks to personnel, significantly extend the operating life of your equipment, reduce operating cost and avoid downtime. **CLINCHER®** recommends a program of frequent routine inspection, and if equipment is suspected to have been damaged during transit, has suffered some form of significant overloading/impact during operation, or is to be mobilized to a remote location where maintenance operations are difficult to carry out, perform the following:

A) Visually inspect components on power tong which could possibly have been damaged either during operation or transit. *i.e.* Damage to hanger assembly, hydraulic backup, mounting legs, or hydraulic valve assembly.

B) Check test date. Ensure that a load test and inspection was carried out within the last 9 months.

C) Check ring gear. Check for any signs of damage or wear.

D) Remove motor and valve assembly from tong body.

E) Check motor seal. Apply hydraulic power, run motor and visually check motor seal for any signs of leakage.

F) Check drive gear. Check for excessive sign of wear on motor gear.

G) Check condition of control valve spools. Activate valves and check for any sign of wear, pitting, or scoring of the chrome surface of spools. If spool is damaged in any way, the complete section must be changed out. Spools are not interchangeable.

H) Check dumbell rollers, shafts, and bushings. Check for excess movement on either bearings, bushings, shafts, or dumbells.

I) Check idler gears and bearings. Check that there are no signs of worn, chipped, or broken teeth on idler and center pinion shaft gears.

J) Check door bearings. Visually check excess movement on bearings at door assembly. If excess movement is found door must be removed making careful note of bearing washer positions for reassembly.

K) Check door switch system. Visually check that door switch valve has sufficient strength to hold door in closed position. If this is not the case, then repairs are required.

L) Check door safety device. Functionally check tong door safety switch. Engage low gear, open tong door and push rotor control lever forward as if to rotate rotor. If safety device is operational then the rotor will not rotate.

M) Check lifting hanger test date. Check lifting hanger for damage. Ensure that a load test and inspection was carried out within the last 9 months.

N) Check condition of all hydraulic hoses and fittings. Visually inspect all hydraulic hoses fitted to the tong for any signs of leaks, cuts, or wear.

O) Reinstall all parts which were removed for inspection and/or damage. Connect to hydraulic power supply and function test operation of tong in high, low, forward, and reverse. Torque test utilizing appropriate dies and test mandrel. Test operation of lift cylinder.

P) Inspect power unit system according to manufactures specifications.

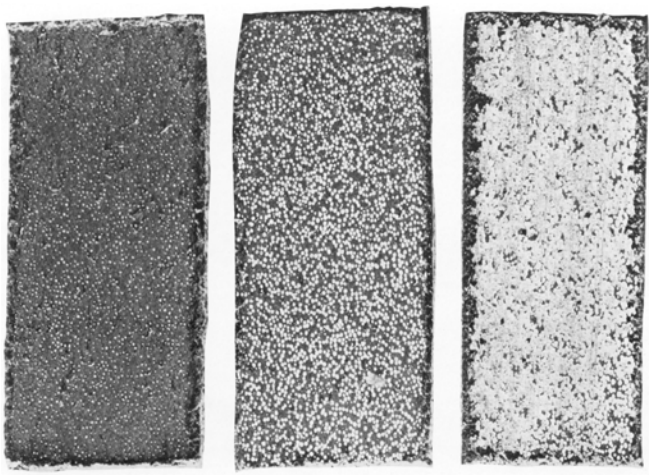
Q) Lubricate tong according to maintenance schedule preceding this section.

R) Paint, remembering to mask off surfaces not intending to paint with grease or masking tape.

S) Complete dated inspection report giving details of all duties performed along with complete list of items replaced.

MAINTENANCE INSTRUCTIONS

DU® BEARING DRY WEAR PROCESS



1. 2. 3.

1. Running-in completed. Low wear rate starts when up to 10% of the bronze is exposed.
2. Typical surface appearance when DU® bearing approaches its half life with 40% to 50% of the bronze exposed.
3. Bronze is beginning to smear near the end of DU's useful life as a dry bearing.
   Over 75% of the bronze is visible at the surface.

For additional information about DU bearings, please contact
Garlock Bearings Inc,
700 Mid Atlantic Parkway, Thorofare, New Jersey 08086.
(609) 848-3200 FAX: (609) 848-5115

Coltec Industries

Garlock Bearings Inc

TROUBLE SHOOTING

HYDRAULIC SYSTEM

Hydraulic Pump Making Excessive Noise:

	Problem	Solution
A)	Restricted or clogged intake line	Clean line, check for contamination.
B)	Contaminated fluid	Flush system, change fluid.
C)	Restricted vent	Clean or replace air vent.
D)	Air in fluid	Check for leaks and be certain fluid suction in tank is well below hydraulic fluid in reservoir.
E)	Damaged or worn parts	Repair or replace damaged parts, check fluid for contamination.
F)	Excessive RPM	Check PTO, gears, and recommended speed to assure proper pump is installed for operation.
G)	Increased friction	Make sure pump has been assembled using correct torque values.
H)	Damaged or worn relief valve.	Replace relief valve.
I)	Damaged or worn check valve.	Replace check valve.
J)	Restricted discharge	Check to make sure relief valve is set to proper pressure.
K)	Valve system restricted	Inspect and repair or replace defective parts, check system for contamination.

Excessive Wear to Hydraulic Components:

	Problem	Solution
A)	Fluid contamination	Flush fluid system, replace with new fluid.
B)	Components misaligned	Inspect and realign.
C)	High operating pressures	Gauge and set to proper pressure.
D)	Exhausted fluid (depletion of additives)	Flush fluid system, replace with new fluid.
E)	Air in fluid	Check for leaks, and be certain fluid suction in tank is well below hydraulic fluid in reservoir.
F)	Shortened bearing life	Check alignment, insure proper lubrication to non-sealed bearings.

Slow Tong Speed:

	Problem	Solution
A)	Restricted supply line	Clear supply line and check intake on reservoir.
B)	Low fluid level	Add fluid to proper volume.
C)	Air leak	Locate and repair leak.
D)	Pump speed insufficient	Assure proper pump speed for application.
E)	Damaged or worn equipment	Isolate pump and check pressure to determine whether motor or pump is defective. Repair or replace defective part.
F)	Pump not primed	Check fluid viscosity and restrictions of intake line. Replace fluid if inadequate for operating temperature.
G)	Low or no flow from supply line	Check to assure couplings are securely fastened.
H)	Hydraulic bypass valve malfunction	Inspect. Adjust unloading pressure. Replace or repair as necessary.

TROUBLE SHOOTING

HYDRAULIC TONG SYSTEM

Insufficient Torque:

	Problem	Solution
A)	Door switch malfunctioning	Check to make sure door is completely closed. Inspect door switch and dump valve. Replace or repair door switch and/or dump valve.
B)	Relief valve malfunctioning	Relief set too low, broken valve spring, contamination or defective seals.
C)	Damaged or worn pump parts	Inspect, repair, or replace.
D)	Slow pump speed	Assure proper pump speed for application.
E)	Improper system fluid	Check fluid viscosity and replace fluid if inadequate for operating temperature.
F)	Directional control valve set improperly	Check relief and directional control valve. Neutral should return slightly to reservoir.
G)	Damage tong motor	Inspect, repair, or replace.
H)	Restriction of supply line, excessive back pressure	Check to assure couplings are securely fastened.
I)	Defective gauge or load cell	Inspect, repair, or replace. Assure unit has been calibrated to proper arm length. NOTE: When using **CLINCHER®** integral backup system, it is the length of backup arm, NOT the tong arm length.

Difficulty Shifting Gears:

	Problem	Solution
A)	Broken key in shifting yoke	Inspect and replace key stock in shifting yoke.
B)	Worn or damaged shifting yoke pins	Inspect and replace broken or worn pins.
C)	Insufficient lubrication	Pump grease into both zerts located on shift housing.
D)	Detent ball bearing spring set too tight	Inspect and relieve pressure by adjusting set screw/spring plunger on shifting gear PN 55084-02.

Failure to Grip Tubulars:

	Problem	Solution
A)	Jaws move out from neutral, but fail to penetrate pipe. Tong not perpendicular.	Inspect die size and replace with correct dies for pipe. Wrong size dies for tubulars. Assure suspension of tong is perpendicular to tubulars. Adjust hanger as necessary.
B)	Jaws fail to move out of neutral. Brake band not tight enough, faulty cam followers, rust debris or damage to jaws.	Inspect for excessive wear on brake band. Inspect and replace defective cam followers. Remove rust and debris from jaws, and jaw pockets. Inspect jaw rollers and pins for wear, flats, and lubrication. Repair, replace, and lubricate as needed.
C)	Tong will not release from tubular. Brake band not tight enough, defective cam followers in cage plate, insufficient lubrication to jaw pin and roller.	Inspect for excessive wear on brake band. Inspect and replace defective cam followers. Remove rust and debris from jaws, and jaw pockets. Inspect jaw rollers and pins for wear, flats, and lubrication. Repair, replace, and lubricate as needed.
D)	Tong motor runs but ring gear does not rotate. Broken gears or defective shift in hydraulic tongs system.	Inspect and replace defective gears. Inspect and repair or replace defective shifting parts.

TROUBLE SHOOTING

HYDRAULIC TONG SYSTEM

Failure to Grip Tubulars:

	Problem	**Solution**
E)	Tong binds under light load. Worn or damaged cam followers, dumbell roller bearing, or idler bearing.	Inspect and replace defective parts.
F)	Ring gear rotates while control lever is in neutral.	Replace control valve.
G)	Shift will not stay in set position. Lost spring plunger.	Replace spring plunger.
H)	Hydraulic fluid leaking from motor. Damaged or worn motor shaft seal.	Replace motor shaft seal.

RECOMMENDED SPARE PARTS LIST FOR REMOTE AREAS

Quantity	Part Number	Description
1	12501437	Seal for Rineer Motor
2	14666	Dovetail Jaw Pins
2	14667	Dovetail Jaw Rollers
8	1001	1/8 NPT Zerts
1	SLV1000-01	Door Switch Valve
4	26005	Brake Band Assy.
8	71017	Jaw Retract Spring
1	A35-MRV-1	A-35 Relief Cartridge

ACCESSORIES AND OPTIONS

Several different accessory items are available for the **CLINCHER®** Tong to allow them to be customized to provide a system most appropriate for the end user's application.

CLE22000XHT-05 Tong Accessories

Compression Load Cell and Torque Gauge	directly measures applied torque
Tension Load Cell and Torque Gauge	directly measures applied torque
Solenoid Operated Module for Dump Valve	allows computer to limit torque applied
Lift Cylinder with Integral Spring Hanger	controls vertical position
TSP-80 Tong Speed Control	allows slow speed rotation with full torque

SECTION 9 CLE22000XHT-06 TONG ILLUSTRATIONS

22" XHT **CLINCHER®** TONG ASSEMBLY *(Sht. 1)* ..... 9 - 3
22" XHT **CLINCHER®** TONG ASSEMBLY *(Sht. 2)* ..... 9 - 4
1 7/8" CAM FOLLOWER *(Assy. No. SSCF1875-02)* ..... 9 - 4
2" FLANGED SEVERE SERVICE CAM FOLLOWER *(Assy. No. SSCFF2000-02)* ..... 9 - 4
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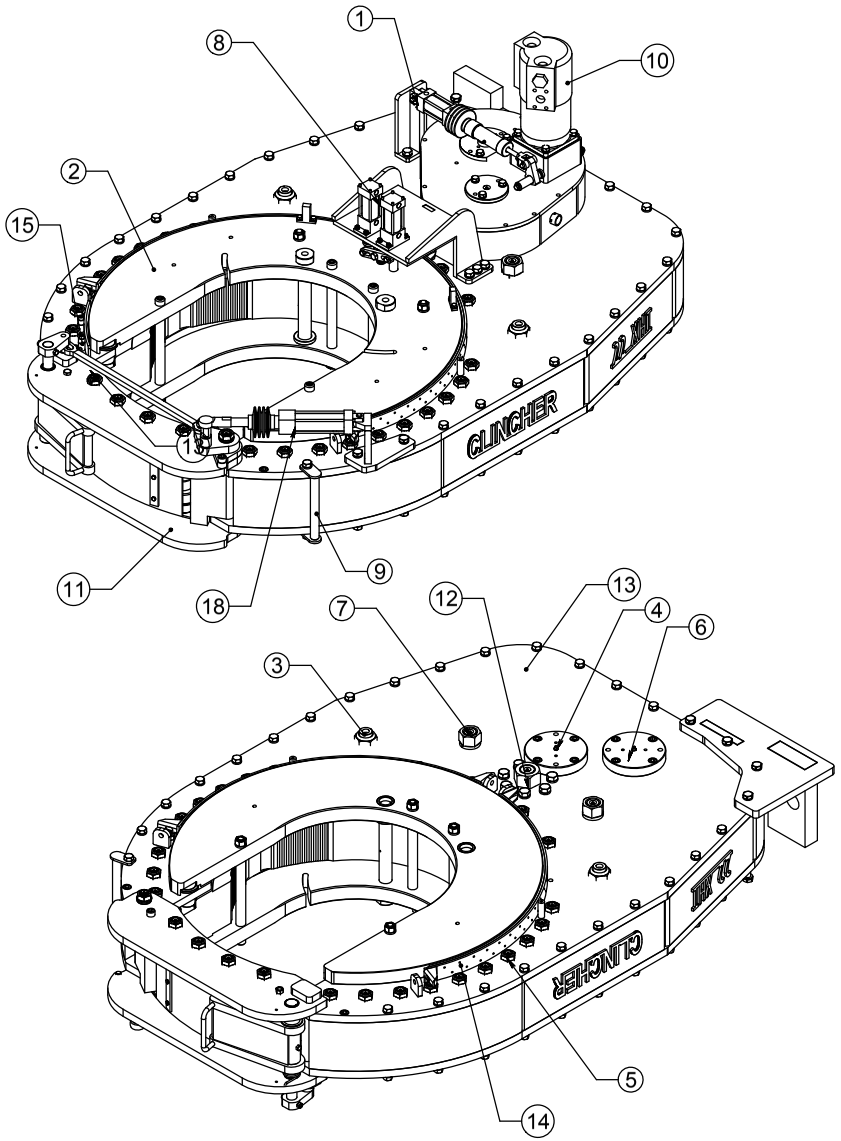
PINION GEAR ASSEMBLY *(Assy. No. 22068)* ..... 9 - 13
SECONDARY GEAR ASSEMBLY *(Assy. No. 22070)* ..... 9 - 14
MOTOR GEAR BOX ASSEMBLY *(Assy. No. 22691)* / SHIFT ASSEMBLY *(Assy. No. 45091)* ..... 9 - 15
MOTOR ASSEMBLY *(Section View)* ..... 9 - 16
CAGE PLATE / RING GEAR ASSEMBLY *(Assy. No. 22023-01)* ..... 9 - 17
TONG DOOR ASSEMBLY *(Assy. No. 22680)* ..... 9 - 18
DOOR VALVE ASSEMBLY *(Assy. No. 26681-01)* ..... 9 - 19
BRAKE BAND ASSEMBLY *(Weldment No. 26005)* ..... 9 - 20
BAIL ASSEMBLY (Assy. No. 26728) ..... 9 - 21
DOVETAIL JAW SET ASSEMBLY ..... 9 - 22
22" COMBO JAW ADAPTER ASSEMBLY *(Assy. No. 20111)* ..... 9 - 23
20" COMBO JAW PUSHER ASSEMBLY *(Assy. No. 20115)* ..... 9 - 24
LOW FRICTION 20" COMBO JAW PUSHER ASSEMBLY *(Assy. No. 20115-LF)* ..... 9 - 24
22" COMBO JAW ASSEMBLY *(Assy. No. 20117-XXXXXA)* ..... 9 - 25
VALVE BANK ASSEMBLY ..... 9 - 27
VALVE BANK ASSEMBLY *(w/Optional Pusher Cylinder Valve)* ..... 9 - 28



Item #	Qty.	Part Number	Part Name
1	1	20016	REMOTE SHIFT CYLINDER ASSEMBLY
2	1	22023	CAGE PLATE/ RING GEAR ASSEMBLY
3	2	22035	IDLER GEAR ASSEMBLY
4	1	22068	PINION GEAR ASSEMBLY
5	24	22069	DUMBELL ROLLER ASSEMBLY
6	1	22070	SECONDARY GEAR ASSEMBLY
7	2	22076	OUTBOARD IDLER GEAR ASSEMBLY
8	1	22108	PIVOT CYLINDER ASSEMBLY
9	1	22152	DOOR FLAP RETAINER
10	1	22188	MOTOR GEAR BOX ASSEMBLY
11	1	22681	TONG DOOR ASSEMBLY
12	1	22740	SHORT IDLER GEAR ASSEMBLY
13	1	22800-03	TONG BODY ASSEMBLY
14	4	26005	BRAKE BAND WELDMENT
15	1	26801	LEFT FINGER GUARD WELDMENT
* 16	38	SSCF1875	1 7/8" SEVERE SERVICE CAM FOLLOWER
* 17	38	SSCFF2000	2" FLANGED SEVERE SERVICE CAM FOLLOWER ASSEMBLY
18	1	22026	DOOR CYLINDER ASSEMBLY

* SOME ITEMS NOT SHOWN

22" XHT TONG

ASSEMBLY NO. CLE22000XHT-06

1 of 2

SUPERIOR Manufacturing & Hydraulics
4225 HWY. 90 EAST
BROUSSARD, LA 70518
(318) 837-8847

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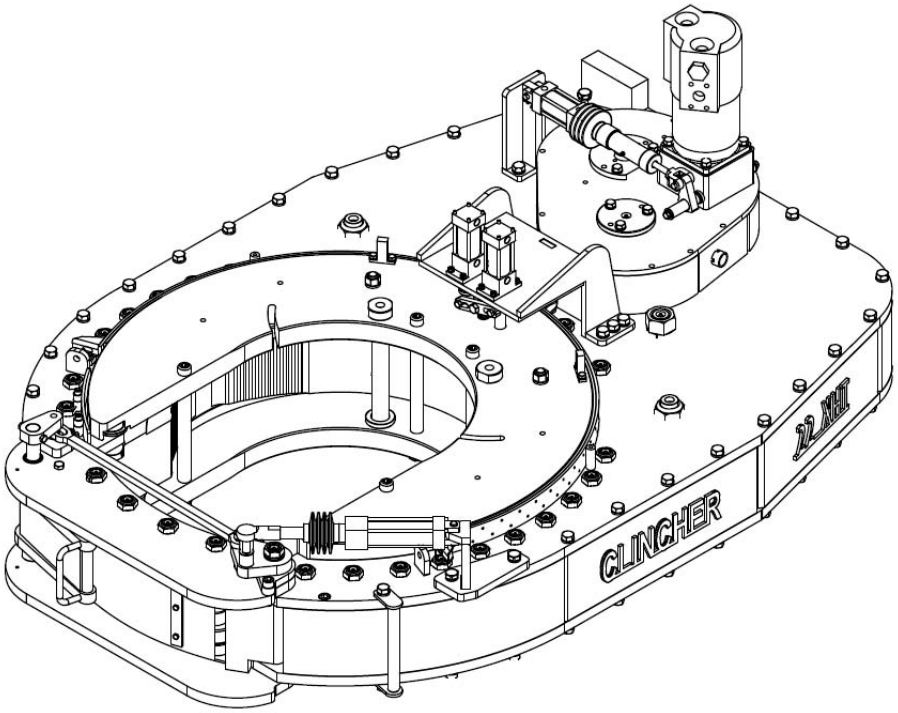
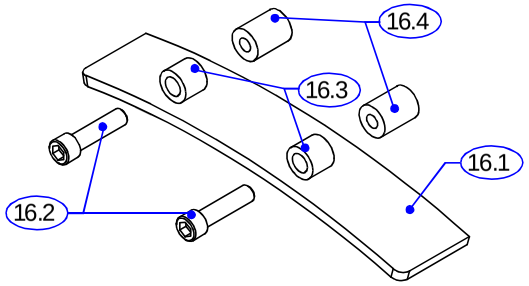
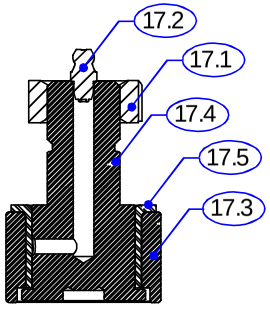
REV. #	LOG #	DATE





LEFT FINGER GUARD WELDMENT NO. 26801

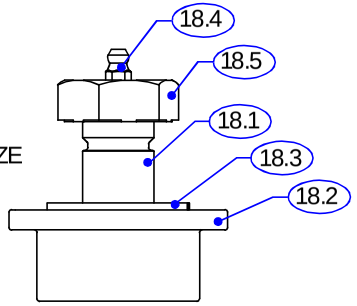
Item #	Qty.	Part Number	Part Name
16.1	1	26801-S1	WELDMENT #1
16.2	2	238	3/8"-16 x 1 1/2" SHCS
16.3	2	26801-S2	WELDMENT #2
16.4	2	26801-S3	WELDMENT #3



CAM FOLLOWER ASSEMBLY NO. SSCF1875-02

Item #	Qty.	Part Number	Part Name
17.1	1	1178	7/8-14 NF NYLOCK JAM NUT
17.2	1	1257	1/4 DRIVE ZERT
17.3	1	73007	CAM FOLLOWER RACE
17.4	1	73008	CAM FOLLOWER STUD
17.5	1	73009	FLANGE BUSHING

NOTE:
1. PRESS FLANGED BUSHING INTO CAM FOLLOWER RACE.
2. LUBRICATE THREADS WITH NEVER-SEEZE & MAKE UP TORQUE 62 1/2 FT.LBS.



2" FLG. SS CAM FOLLOWER ASSEMBLY NO. SSCFF2000-02

Item #	Qty.	Part Number	Part Name
18.1	1	73008	CAM FOLLOWER STUD
18.2	1	SSCFF2001	CAM FOLLOWER RACE
18.3	1	73009	FLANGE BUSHING
18.4	1	1257	1/4 DRIVE ZERT
18.5	1	1178	7/8-14 NF NYLOCK JAM NUT

22" XHT TONG ASSEMBLY

CLE22000XHT-06
2 of 2

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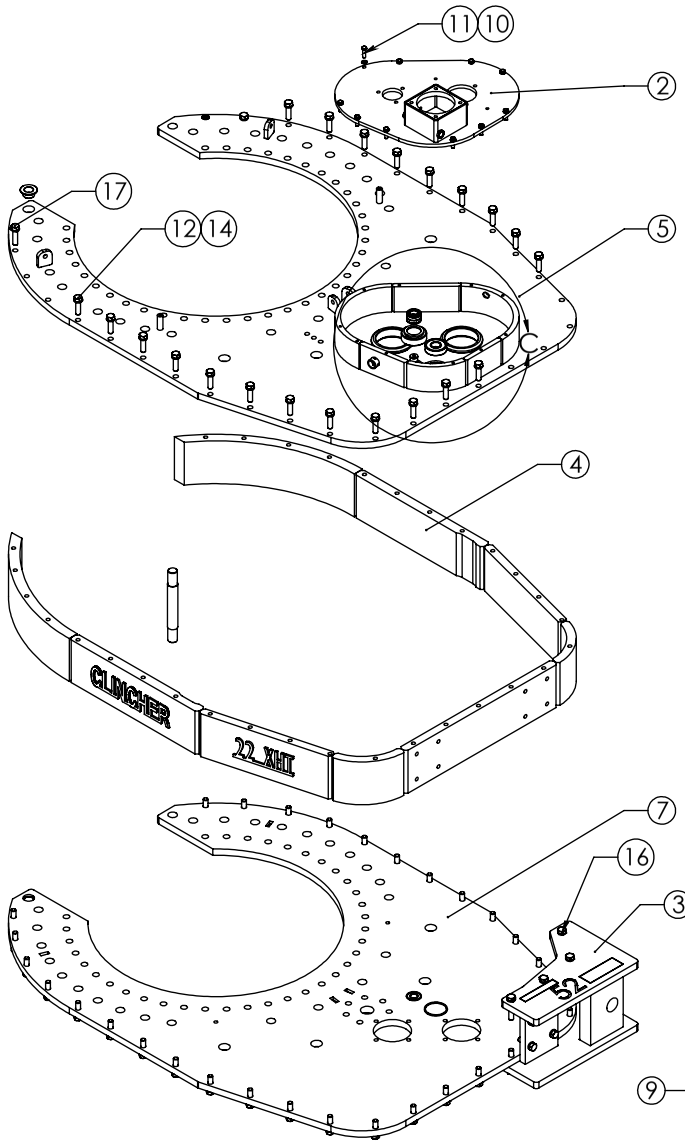
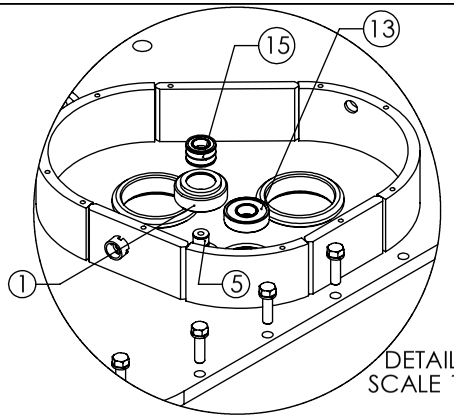
		01/10/07
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-05\Assembly sht2.wpg



Item #	Qty.	Part Number	Part Name
1	1	55123-03	HIGH GEAR IDLER
2	1	73091-W	LOW GEAR HOUSING COVER WELDMENT
3	1	22197	TENSION BRACKET WELDMENT
4	1	22603-01	MID BODY WELDMENT
5	1	22612-02	TOP PLATE WELDMENT
6	1	22615	DOOR JAM
7	1	22616	BOTTOM PLATE
8	2	26680-S7	DOOR PIVOT BUSHING
9	4	257	5/8"-11 X 1 1/2" SHCS
10	10	1027	WASHER, LOCK 3/8"
11	10	1048	3/8"-16 X 1 1/4" HHCS
△1 12	50	201	5/8"-11 X 2 1/4" HHCS
13	1	1901	BEARING
14	60	1151	5/8 LW
15	1	1920	25mm ID X 47mm OD X 30mm W/ snap ring BEARING
△1 16	8	204-A	5/8"-11 X 3 1/4" HHCS
△1 17	2	202	5/8"-11 X 2 1/2" HHCS
18	1	1948	INT.SNAP RING -RRT283
19	1	1949	INT.SNAP RING -N5000-187
20	1	1950	EXT.SNAP RING -N5100-100



DETAIL C
SCALE 1 : 12

TONG BODY ASSEMBLY

22800-03

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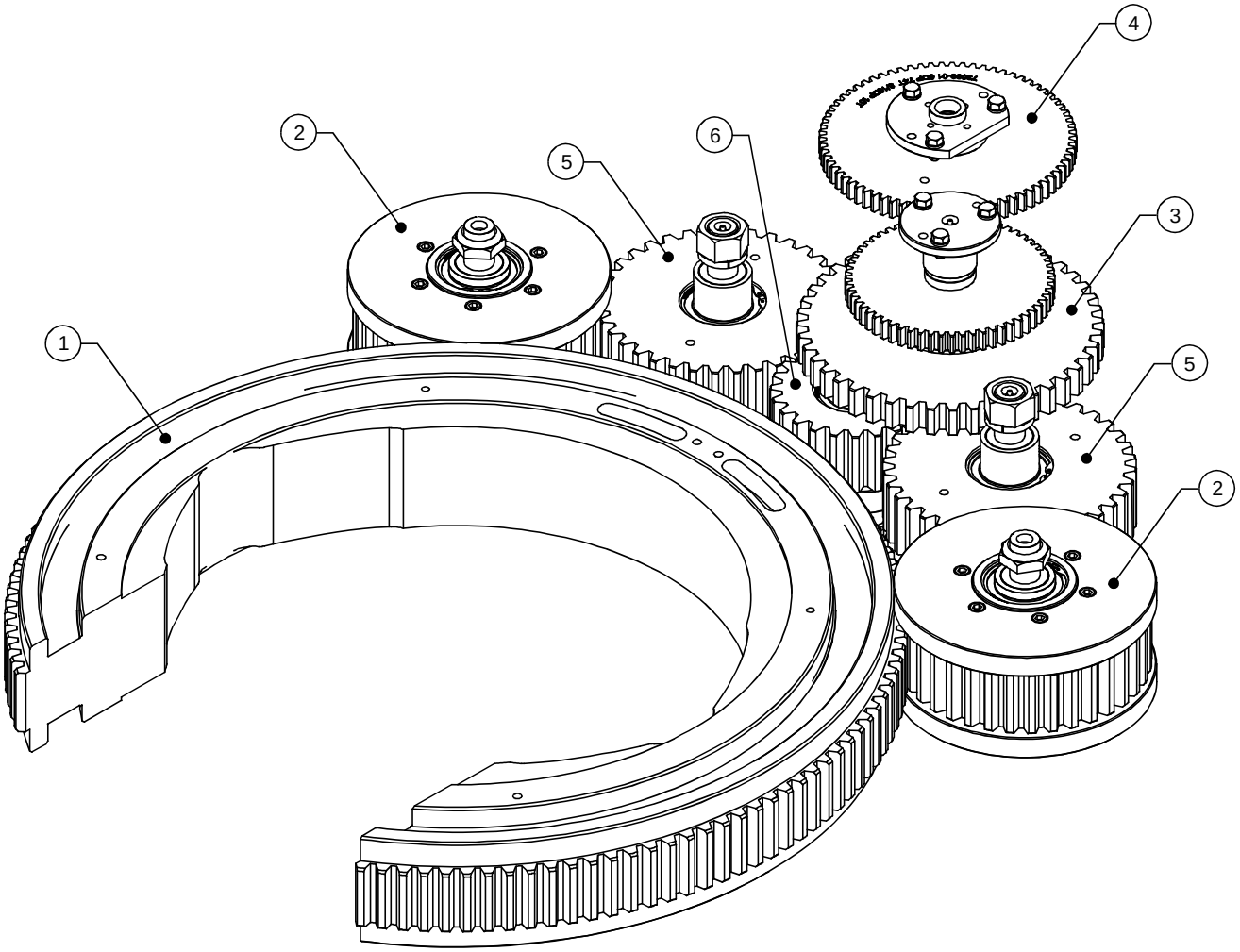
Item #	Qty.	Part Number	Part Name
1	1	22009-02	RING GEAR
2	2	22035	IDLER GEAR ASSEMBLY
3	1	22068	PINION GEAR ASSEMBLY
4	1	22070	SECONDARY GEAR ASSEMBLY
5	2	22076	OUTBOARD IDLER GEAR ASSEMBLY
6	1	22740	SHORT IDLER GEAR ASSEMBLY



22" XHT TONG GEAR TRAIN

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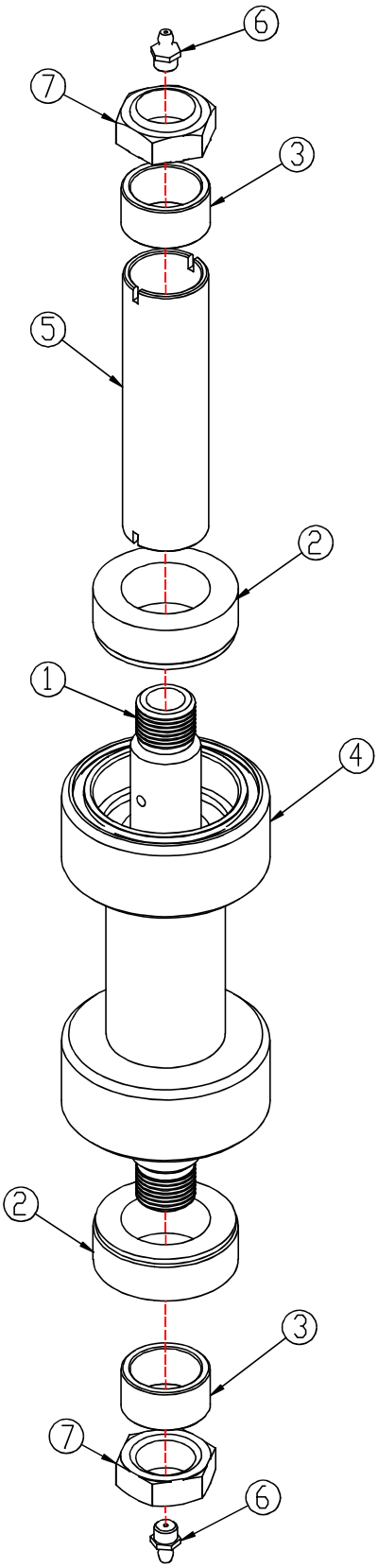
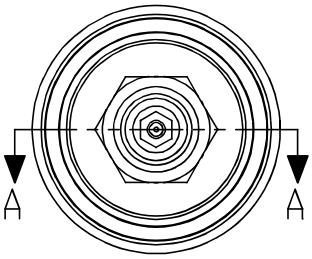
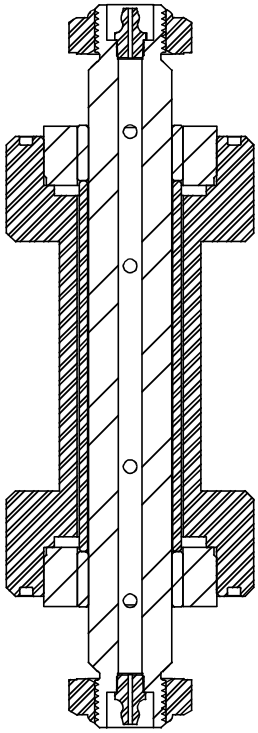
		10/16/06
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-01\Gear Train.wpg

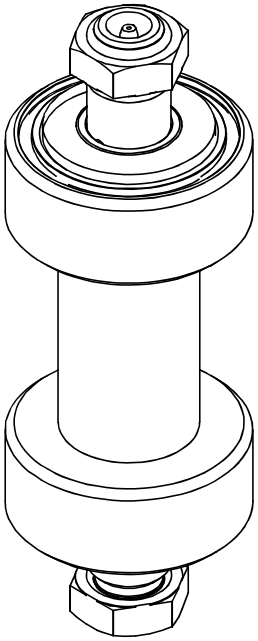


Item #	Qty.	Part Number	Part Name
1	1	22022-A	SHAFT
2	2	55191	DUMBELL ROLLER BUSHING
3	2	55192	DUMBELL ROLLER SPACER
4	1	73070	DUMBELL ROLLER
5	1	73071	DUMBELL ROLLER SPACER
6	2	1001	1/8 NPT ZERT
7	2	1213	1"-12 LOW PROFILE NYLOCK NUT





SECTION A-A
SCALE 1 : 3



DUMBELL ROLLER ASSEMBLY

ASSEMBLY NO. 22069

SUPERIOR Manufacturing & Hydraulics
4225 HWY. 90 EAST
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(318) 837-8847

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		10/17/06
REV. #	LOG #	DATE

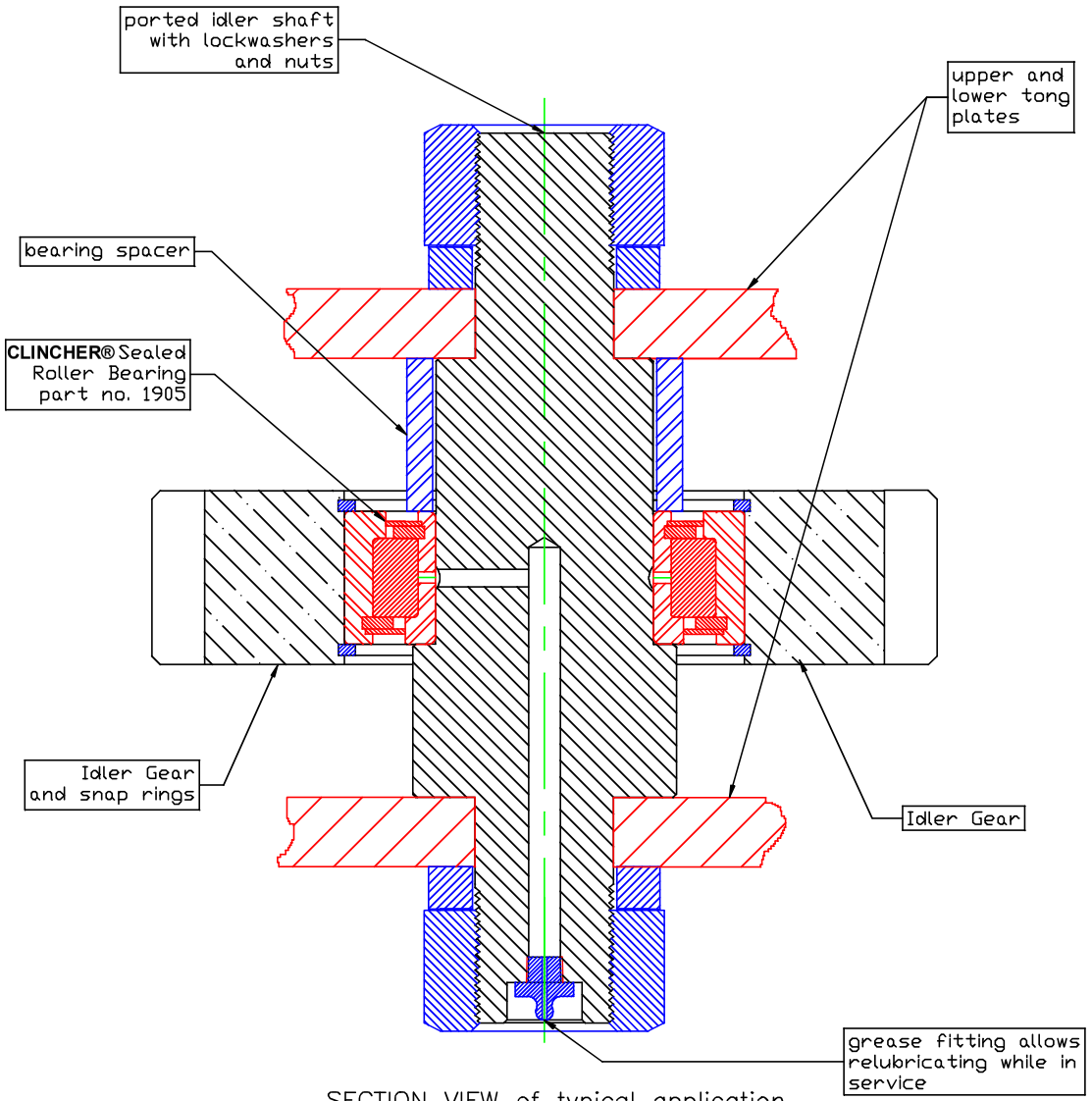
REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-01\22069 Dumbell.wpg

Features and Benefits:
Proprietary sealed bearing with full compliment roller design offers greater load ratings than commercially available sealed ball bearings. The ported inner race allows the bearing to be relubricated without disassembly. Integral elastomeric seals allow grease to be displaced but prevent migration of contaiminants into bearing.

Elastomeric seals are corrosion resistant and suitable for use in environments which are incompatible with traditional aluminum bearing shrouds.

Unique geometric design allows rollers to absorb thrust loads to maximize component life.

Nominal OD: 4.3307 inches
Nominal ID: 2.3622 inches
Nominal Ht: 1.4375 inches
static rating: 37540 lbs
dynaminc rating: 29230 lbs
(1mm cycles, 33 1/3 RPM f/ 500 hrs.)


ported idler shaft with lockwashers and nuts
upper and lower tong plates
bearing spacer
CLINCHER® Sealed Roller Bearing part no. 1905
Idler Gear and snap rings
Idler Gear
grease fitting allows relubricating while in service

SECTION VIEW of typical application

3			
2			
1	DB	12/07/02	added desc of thrust load capability
Rev.#	By	Log#	Description of Revision

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE — R3

2 PLACE DEC. ±.020	3 PLACE DEC. ±.005	FRACTIONS ± 1/16	ANGLES ± .5°	SURFACE 250	FLATNESS AR PL. ± .015 per foot

1. Dimensions are in inches
2. Remove burrs & sharp edges with 1/64x45°max.
3. Machined fillet radii are 1/32
4. Normality,Squareness & parallelism of machine surfaces are .002 per inch, to a max of .012 inches for a single surface.
5. Machine diameters on a common centerline must be concentric within .005 T.I.R & unmachined diameters concentric within .032 T.I.R

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△1 or ⟨1⟩ = Revision Number

1.000 = Critical Dimension 100% Inspection Required

SHEET 1 of 2

SUPERIOR Manufacturing & Hydraulics
4225 HWY.90 E
BROUSSARD,LA 70518
(318)837-8847

PART NAME: SEALED IDLER BEARING

PART #: 1905

DRAWN BY:

APPROVED BY:

CHK BY: DATE:

REF: ILL1000/ILL1142.DWG

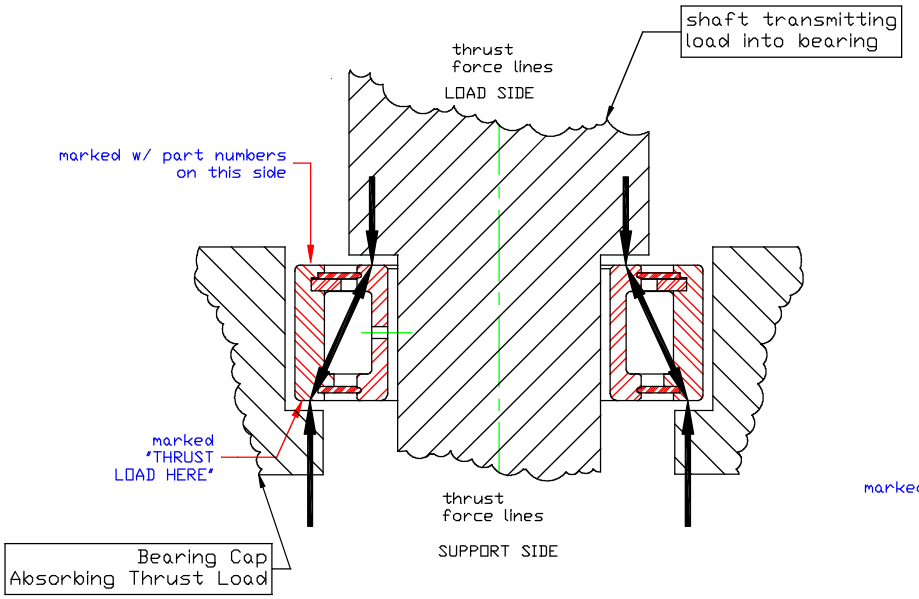
MATERIAL SPECIFICATION

Matl.Req:

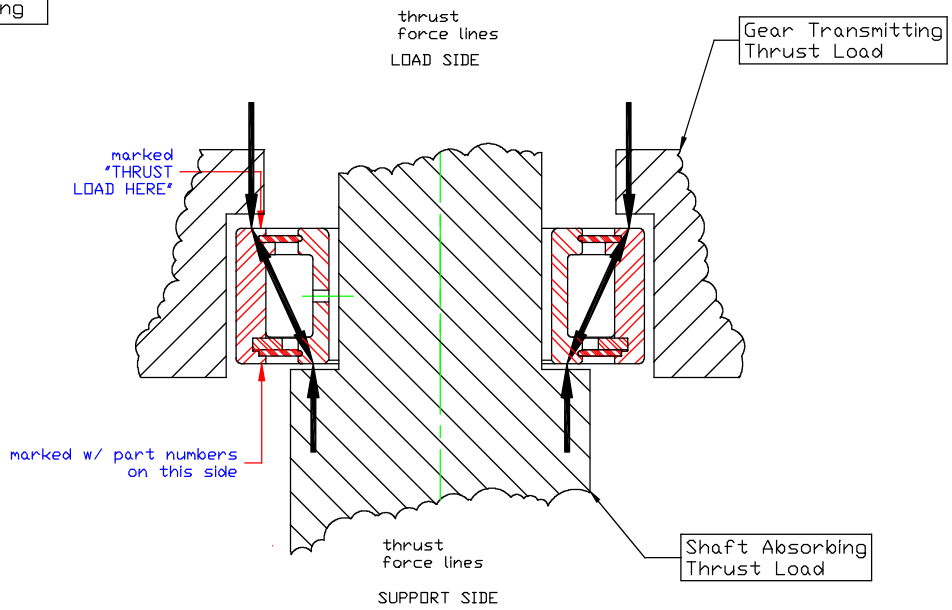
Initial Condition:

Alternative Matl:

H.T Instructions: Case Depth: C.D



Bottom Bearing Cap Application



Gear Support Application

Installation instructions for **CLINCHER®** BEARING Part Number 1905

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE					R3
2 PLACE DEC. ±.020	3 PLACE DEC. ±.005	FRACTIONS ± 1/16	ANGLES ± .5°	SURFACE 250	FLATNESS AR PL. ± .015 per foot

1. Dimensions are in inches
2. Remove burrs & sharp edges with 1/64x45°max.
3. Machined fillet radii are 1/32
4. Normality,Squareness & parallelism of machine surfaces are .002 per inch, to a max of .012 inches for a single surface.
5. Machine diameters on a common centerline must be concentric within .005 T.I.R & unmachined diameters concentric within .032 T.I.R

Rev.#	By	Log#	Description of Revision
3			
2			
1	DB	12/07/02	added desc of thrust load capability

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1.000 = Critical Dimension 100% Inspection Required

SHEET 2 of 2

SUPERIOR Manufacturing & Hydraulics
4225 HWY.90 E
BROUSSARD,LA 70518
(318)837-8847

PART NAME: Installation instructions for P/N 1905 SEALED IDLER BEARING

PART #: 1905

DRAWN BY:

APPROVED BY:

CHK BY: DATE:

REF: REF ILL1000/ILL1142.DWG

MATERIAL SPECIFICATION

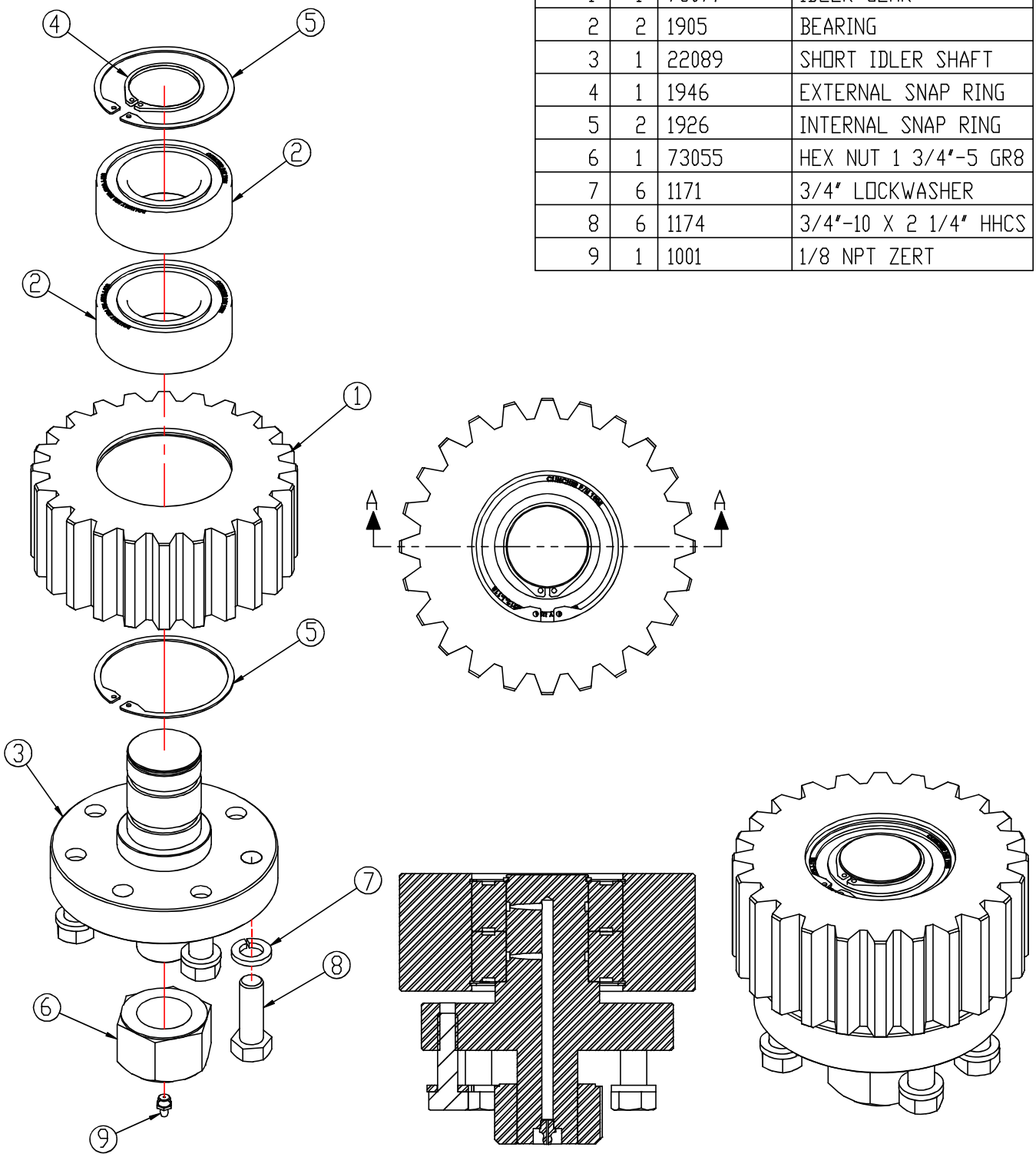
Matl.Req:

Initial Condition:

Alternative Matl:

H.T Instructions: Case Depth: C.D

Item #	Qty.	Part Number	Part Name
1	1	73077	IDLER GEAR
2	2	1905	BEARING
3	1	22089	SHORT IDLER SHAFT
4	1	1946	EXTERNAL SNAP RING
5	2	1926	INTERNAL SNAP RING
6	1	73055	HEX NUT 1 3/4"-5 GR8
7	6	1171	3/4" LOCKWASHER
8	6	1174	3/4"-10 X 2 1/4" HHCS
9	1	1001	1/8 NPT ZERT



SECTION A-A

SHORT IDLER GEAR ASSEMBLY

ASSEMBLY NO. 22740

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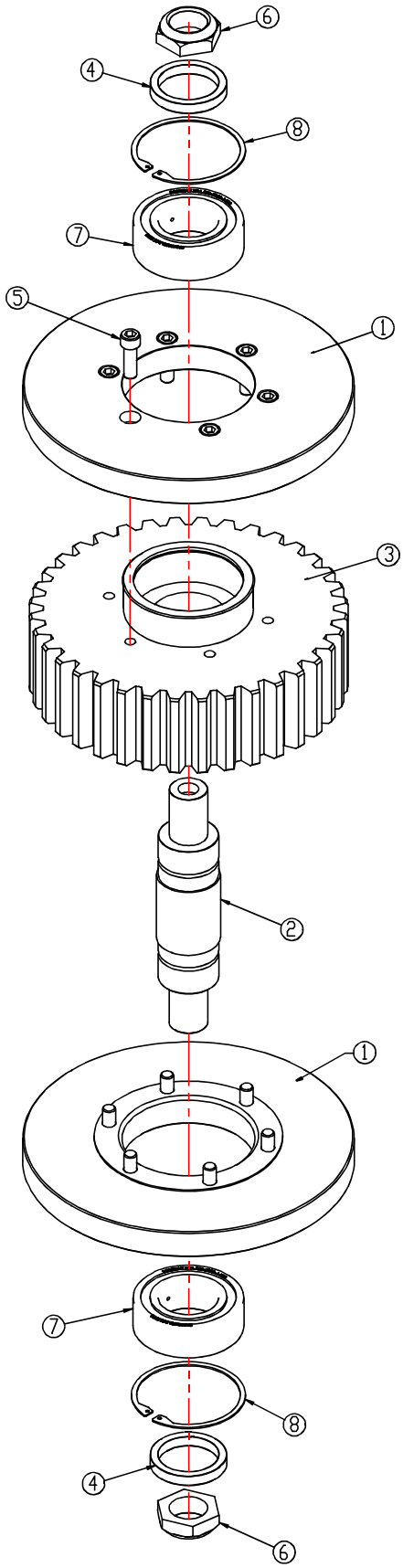
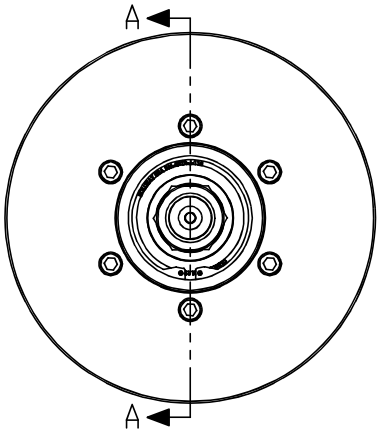
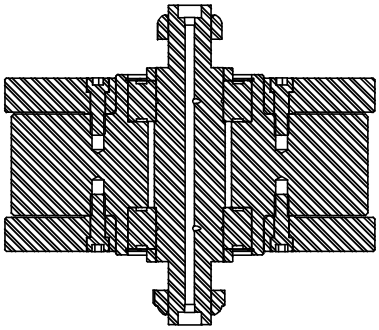
		10/17/06
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-01\22740 Short Idler.wpg

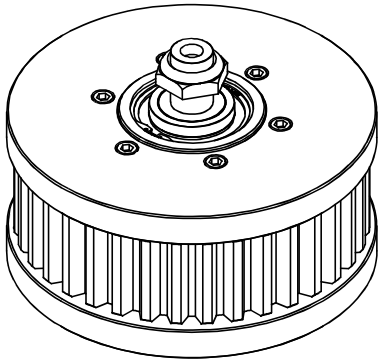
Item #	Qty.	Part Number	Part Name
1	2	22037	IDLER RACE F/ 36 TOOTH IDLER
2	1	22038	IDLER SHAFT
3	1	26036	IDLER GEAR - 36 TOOTH
4	2	82063	IDLER SPACER
5	12	1106-A	1/2"-13 X 1 1/2" SHCS
6	2	1273	1 1/2-12 NYLOCK NUT
7	2	1905	BEARING
8	2	1926	INTERNAL SNAP RING







SECTION A-A



IDLER GEAR ASSEMBLY

ASSEMBLY NO. 22035

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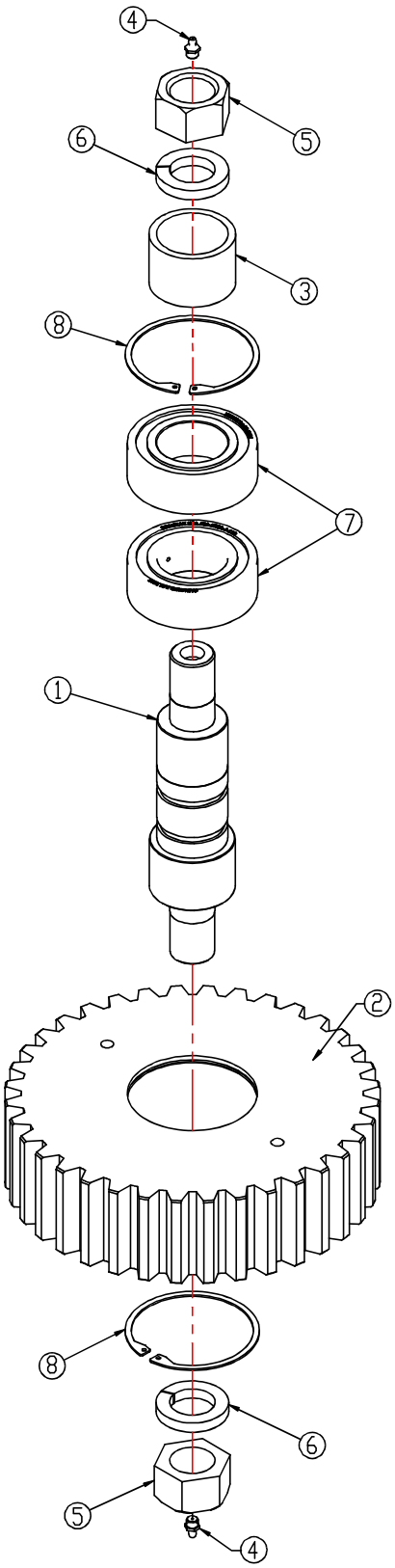
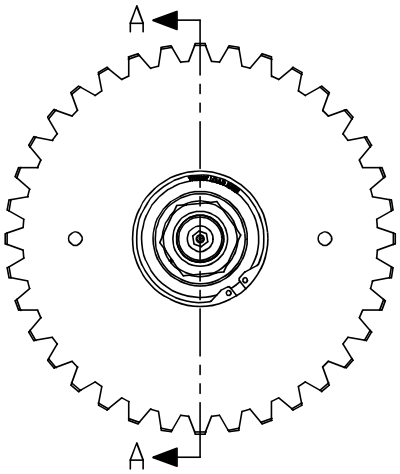
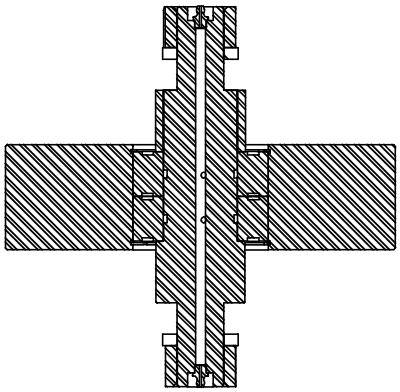
REV. #	LOG #	DATE
		10/17/06

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-01\22035 Idler.wpg

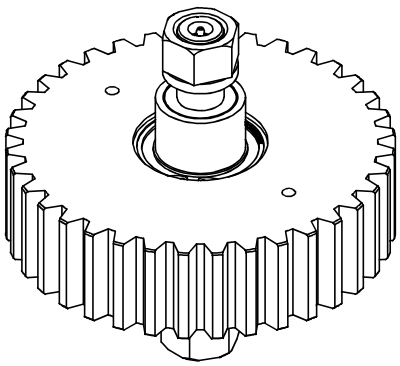
Item #	Qty.	Part Number	Part Name
1	1	22078	OUTBOARD IDLER SHAFT
2	1	26077	IDLER GEAR - 32 TOOTH
3	1	73088	OUTBOARD IDLER SPACER
4	2	1001	1/8 NPT ZERT
5	2	1222	1 1/2"-12 HEX NUT
6	2	1223	1 1/2" LOCKWASHER
7	2	1905	BEARING
8	2	1926	INTERNAL SNAP RING







SECTION A-A



OUTBOARD IDLER GEAR ASSEMBLY

ASSEMBLY NO. 22076

SUPERIOR Manufacturing & Hydraulics
4225 HWY. 90 EAST
BROUSSARD, LA 70518
(318) 837-8847

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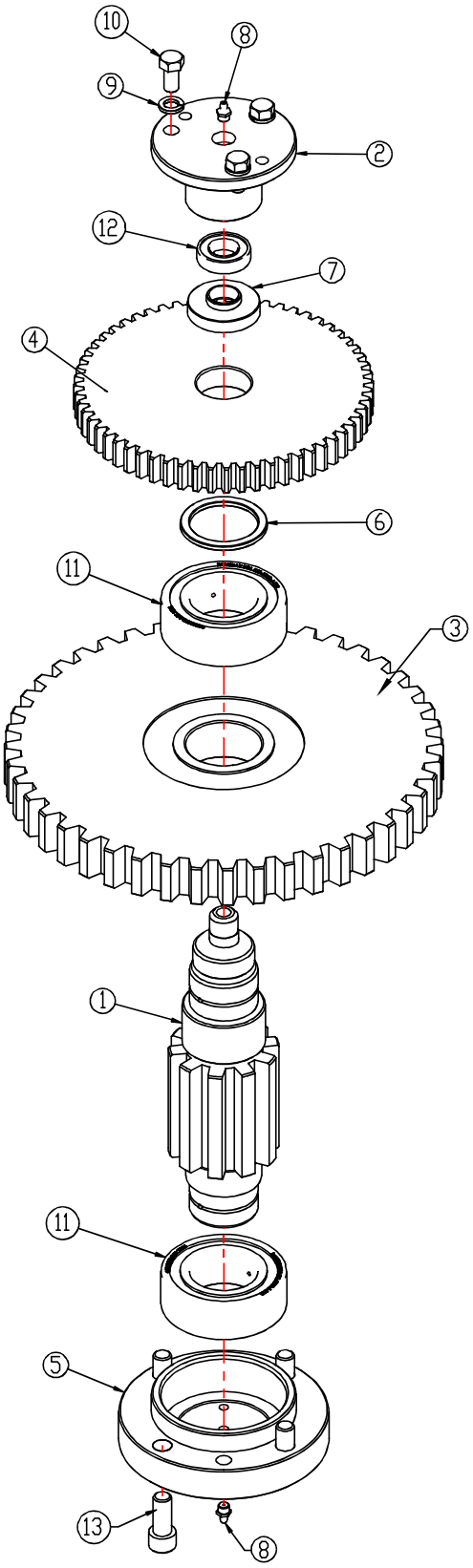
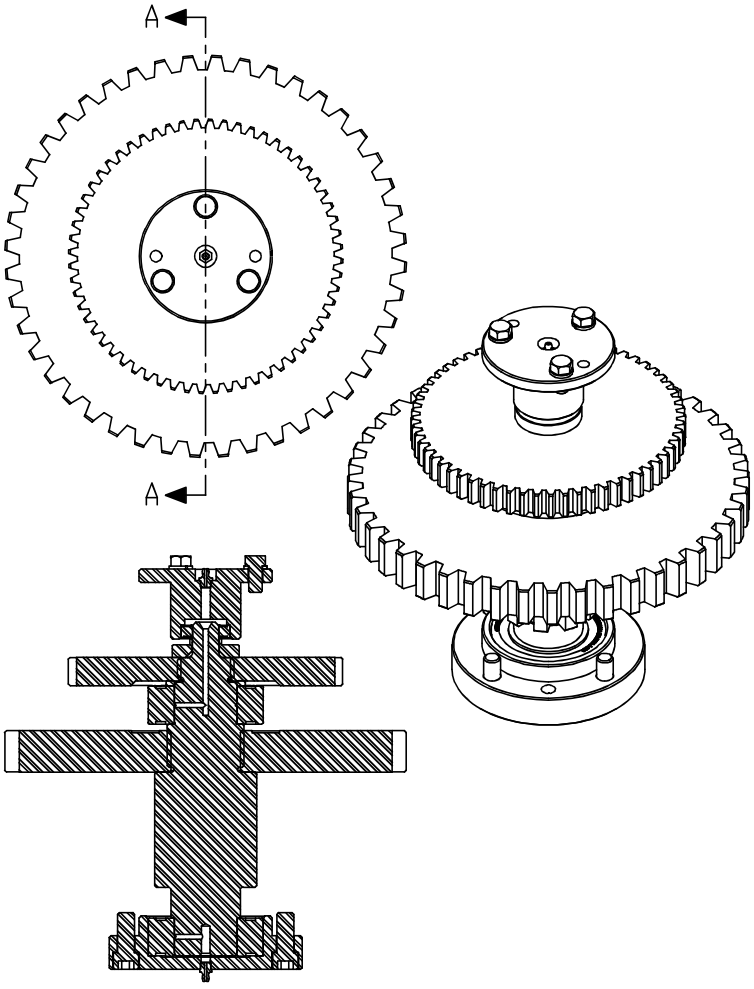
REV. #	LOG #	DATE
		10/17/06

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-01\22076 Outboard Idler.wpg



Item#	Qty.	Part Number	Part Name
1	1	22082-02	PINION GEAR
2	1	73066-01	UPPER PINION BEARING CAP
3	1	73079-01	LOWER PINION GEAR
4	1	73081-01	HIGH GEAR
5	1	73085	LOWER PINION BEARING CAP
6	1	73092	LOWER HIGH GEAR SPACER
7	1	73093	UPPER HIGH GEAR SPACER
8	2	1001	1/8 NPT ZERT
9	3	1103	1/2" LOCKWASHER
10	3	1110	1/2"-13 x 1" HHCS
11	2	1905	BEARING
12	1	1909	BEARING
13	4	257	5/8"-11 X 1 1/2" SHCS



SECTION A-A

PINION GEAR ASSEMBLY

ASSEMBLY NO. 22068

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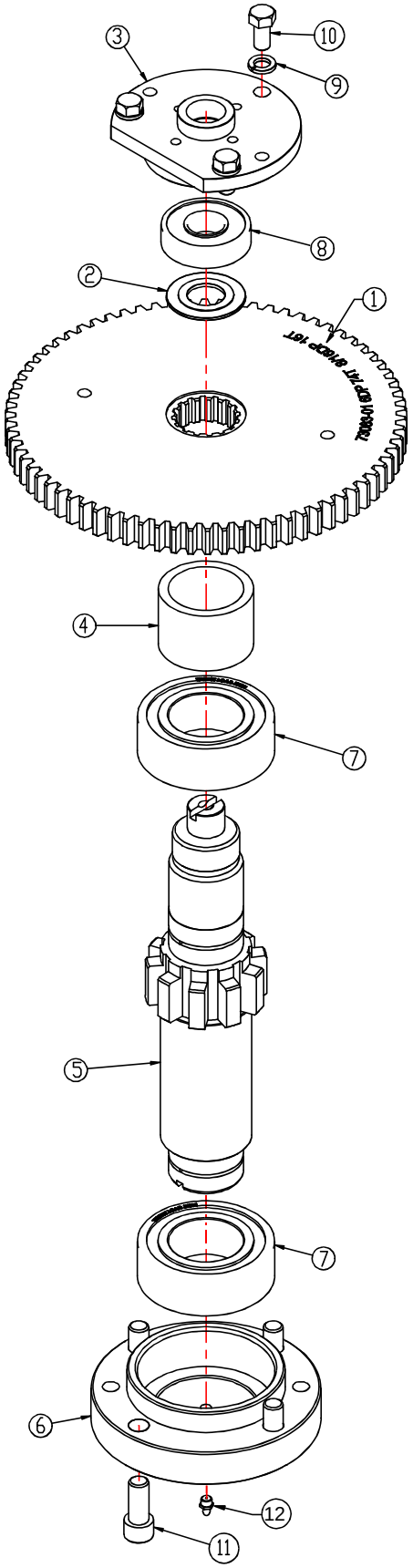
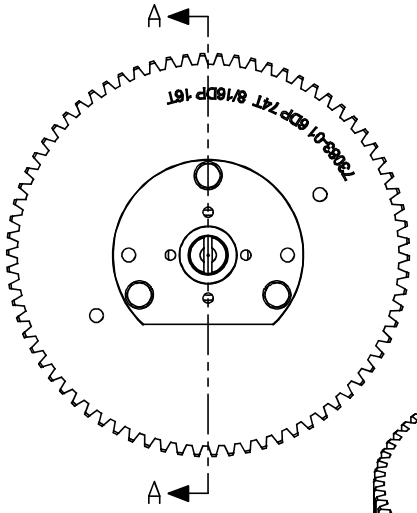
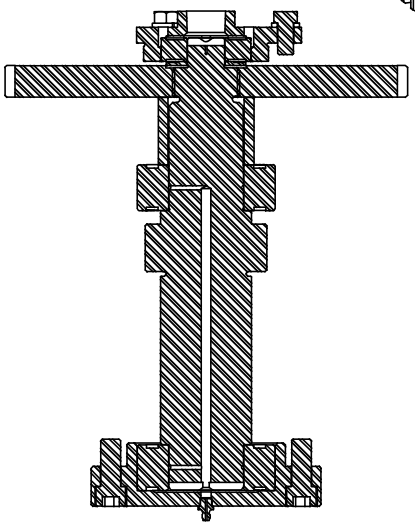
		10/17/06
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-01\22068 Pinion.wpg

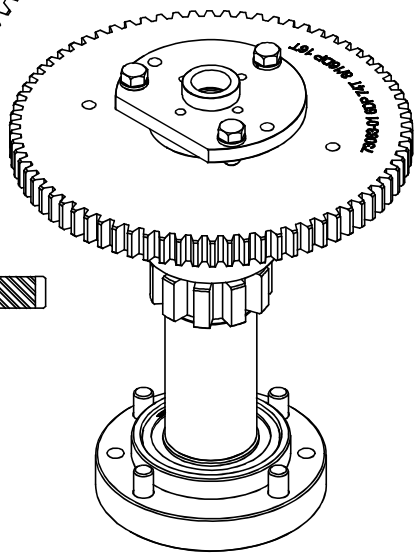
Item#	Qty.	Part Number	Part Name
1	1	73083-01	UPPER LOW PINION GEAR
2	1	73098	UPPER LOW PINION UPPER SPACER
3	1	55143	TOP SECONDARY BEARING CAP
4	1	73097-01	UPPER LOW SPACER
5	1	22084	SECONDARY INPUT GEAR
6	1	73085	LOWER PINION BEARING CAP
7	2	1905	BEARING
8	1	1901	BEARING
9	3	1103	1/2" LOCKWASHER
10	3	1110	1/2"-13 x 1" HHCS
11	4	257	5/8"-11 X 1 1/2" SHCS
12	1	1001	1/8 NPT ZERT







SECTION A-A



SECONDARY GEAR ASSEMBLY

ASSEMBLY NO. 22070

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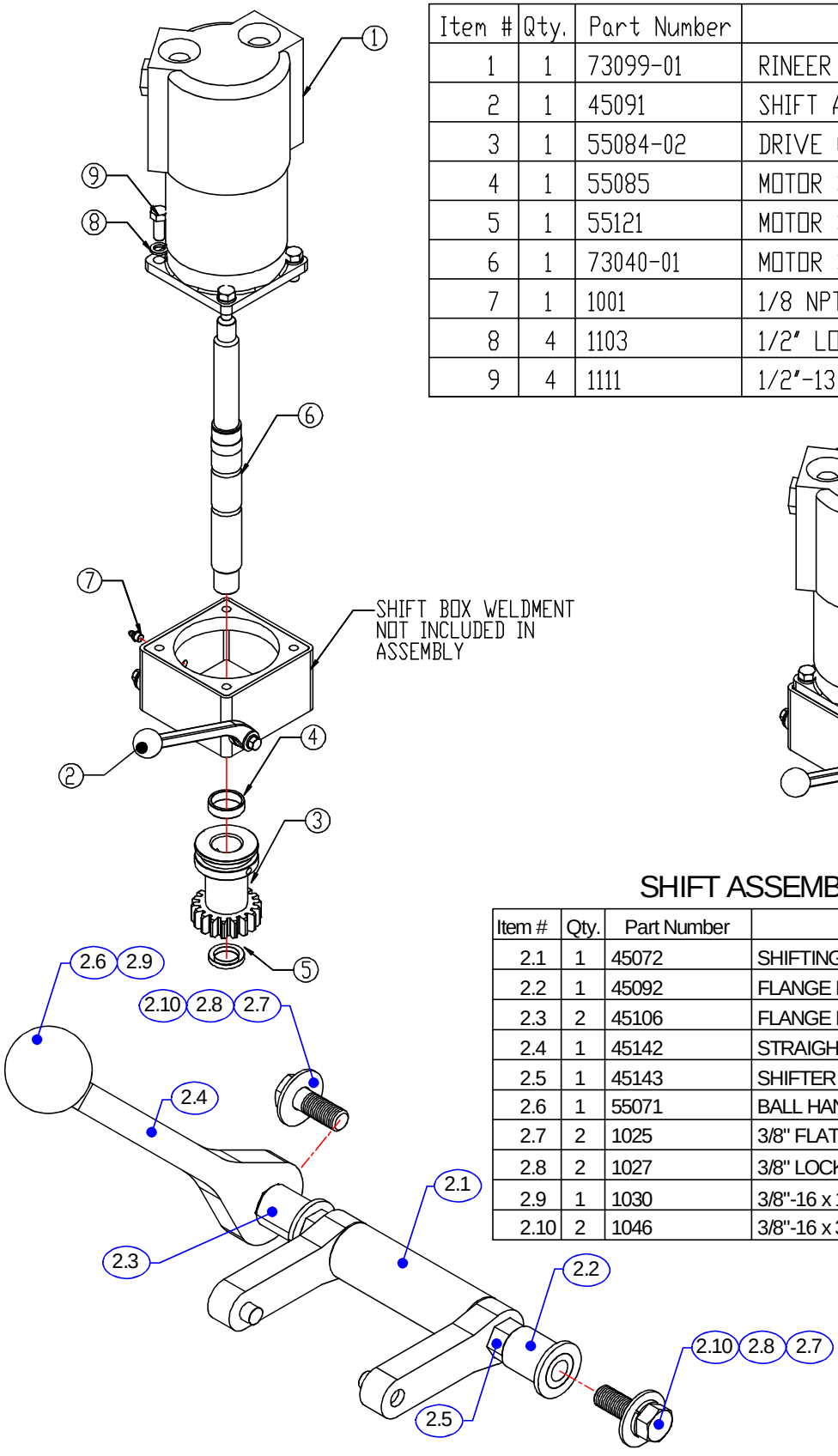
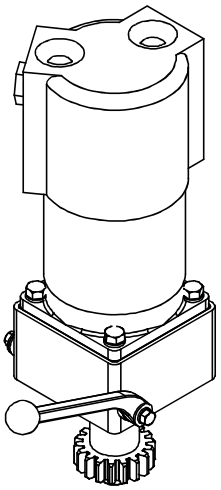
		10/17/06
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-01\22070 Secondary.wpg



Item #	Qty.	Part Number	Part Name
1	1	73099-01	RINEER MOTOR 2SP. 30 cu.inch
2	1	45091	SHIFT ASSEMBLY
3	1	55084-02	DRIVE GEAR
4	1	55085	MOTOR SPACER
5	1	55121	MOTOR SHAFT BEARING SPACER
6	1	73040-01	MOTOR SHAFT
7	1	1001	1/8 NPT ZERT
8	4	1103	1/2" LOCKWASHER
9	4	1111	1/2"-13 x 1 1/4" HHCS



SHIFT ASSEMBLY NO. 45091

Item #	Qty.	Part Number	Part Name
2.1	1	45072	SHIFTING YOKE WELDMENT
2.2	1	45092	FLANGE BEARING SELF-LUBR.
2.3	2	45106	FLANGE BEARING SELF-LUBR. MOD. SPLIT
2.4	1	45142	STRAIGHT YOKE HANDLE
2.5	1	45143	SHIFTER SHAFT
2.6	1	55071	BALL HANDLE #B6
2.7	2	1025	3/8" FLAT WASHER
2.8	2	1027	3/8" LOCKWASHER
2.9	1	1030	3/8"-16 x 1" SET SCREW
2.10	2	1046	3/8"-16 x 3/4" HHCS

MOTOR GEAR BOX ASSEMBLY

ASSEMBLY NO. 22691

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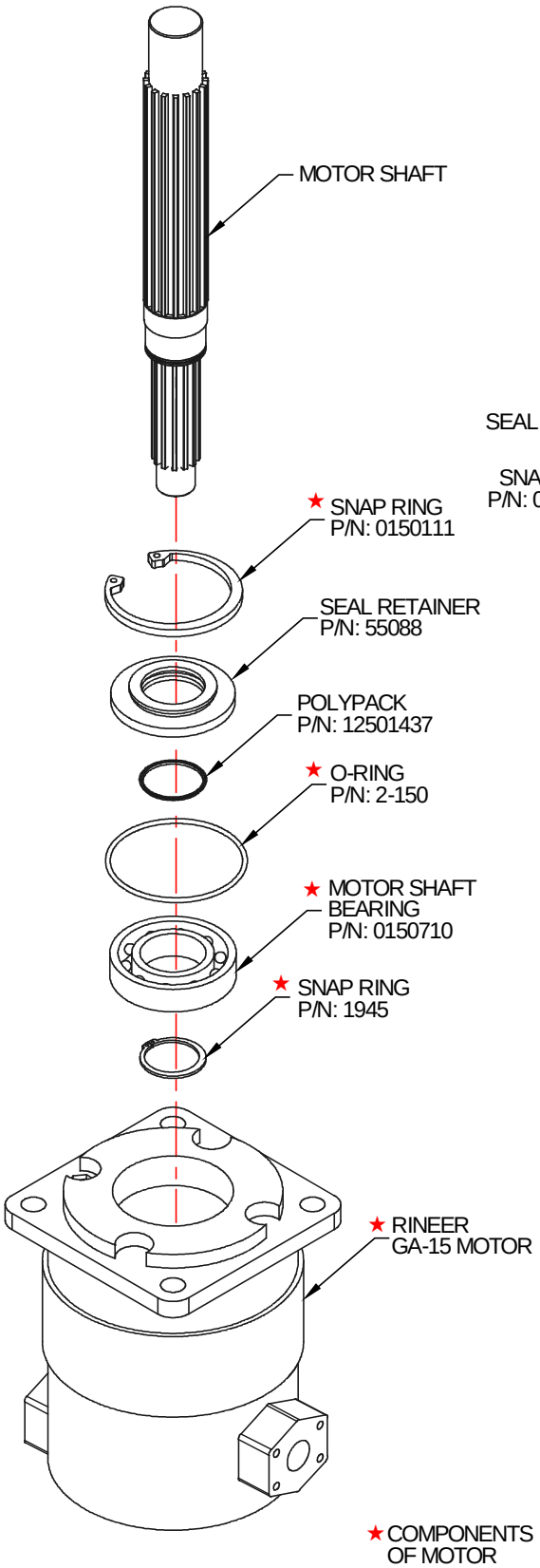
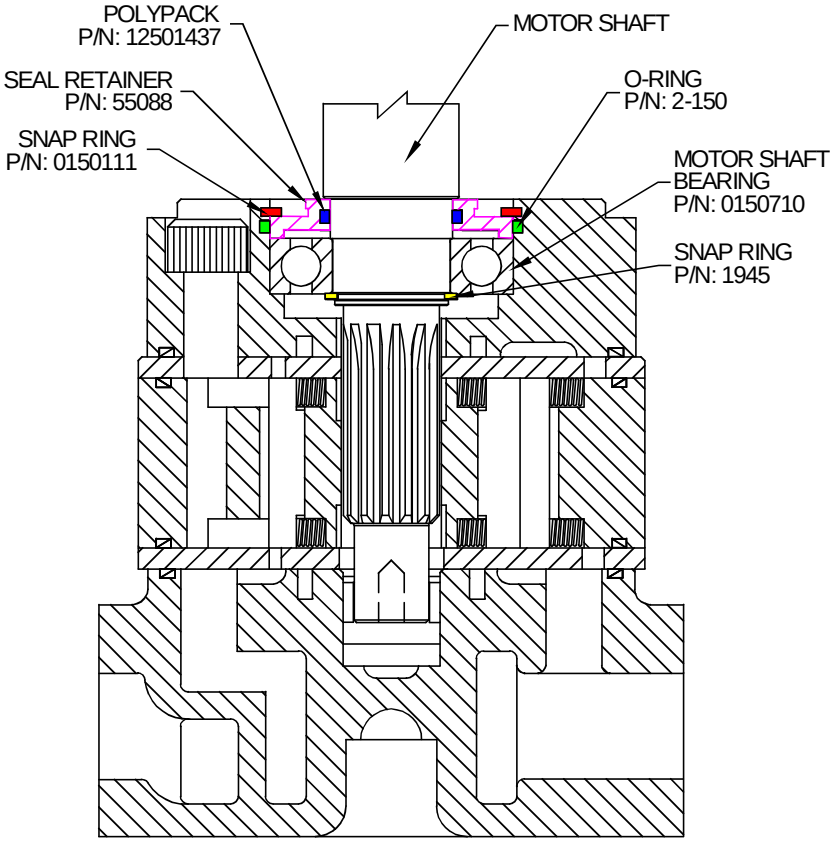
		01/12/07
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-05\22691 Motor.wpg





W/ OUT WIPER RING

FOR CLARITY PURPOSE ONLY
NOT TO SCALE

MOTOR ASSEMBLY

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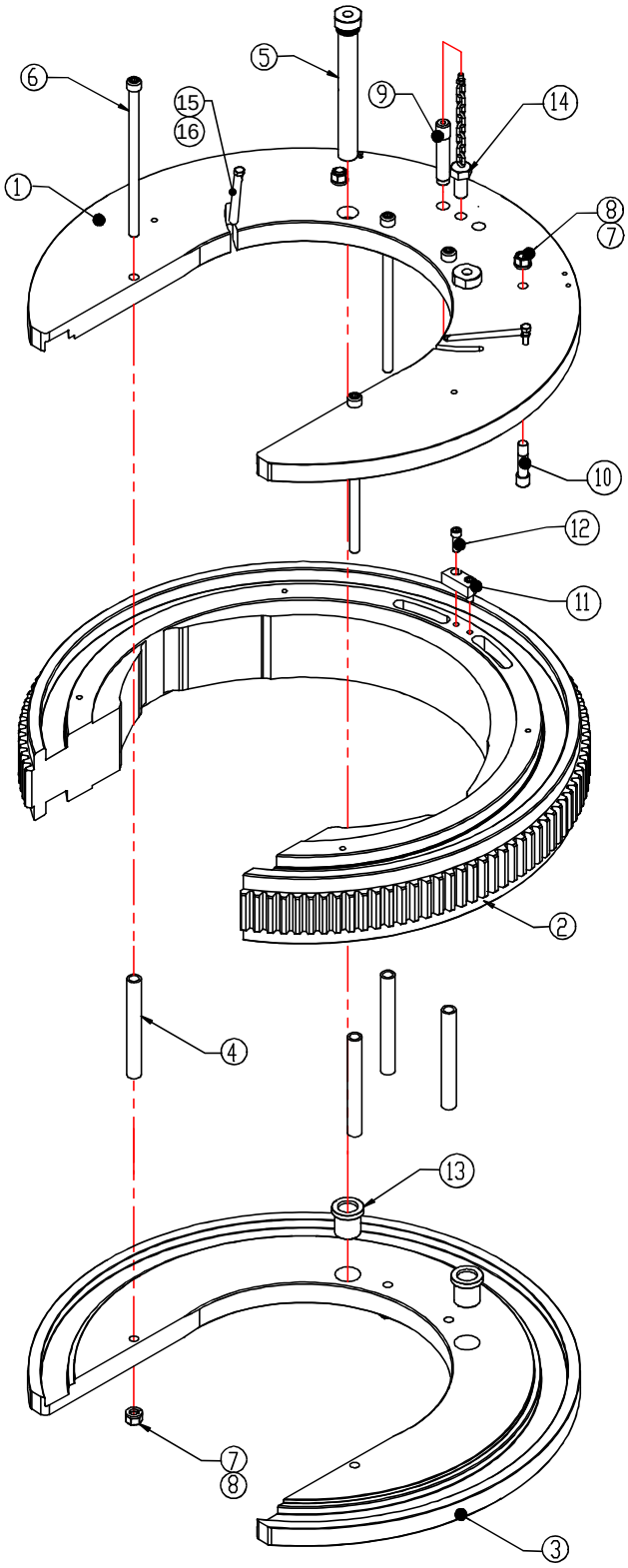
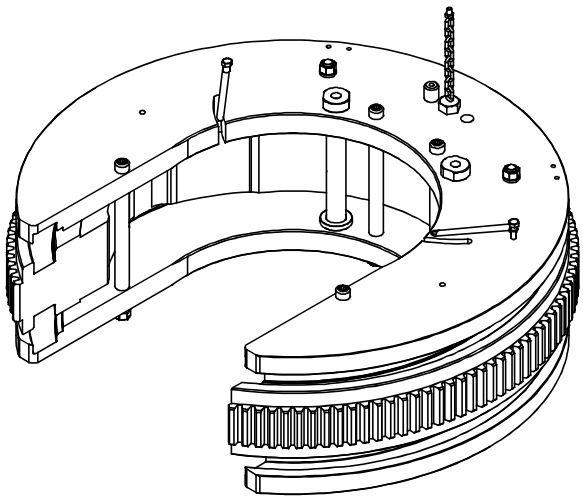
		10/04/06
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\Motor\Motor CLE5500+.wpg



Item #	Qty.	Part Number	Part Name
1	1	22019	TOP CAGE PLATE
2	1	22009-02	RING GEAR -F/ 22" - 132 TOOTH
3	1	22022	BOTTOM CAGE PLATE
4	4	22647	CAGE PLATE SPACER
5	2	14623-01	DOOR PIVOT PIN
6	4	1253-14	3/4"-10 X 14" SHCS
7	6	1176-A	3/4-10 HEX NUT
8	6	1171	3/4" LOCKWASHER
9	1	22729	LOCKING PIN
10	2	20069	RING GEAR STOP
11	1	26067	CAGE PLATE STOP
12	2	1106-A	1/2"-13 X 1 1/2" SHCS
13	2	22024	JAW PIVOT SPACER
14	1	26038	CAGE PLATE REVERSING PIN RETAINER
15	2	71017	EXT. SPRING
16	2	1113	1/2"-13 x 2 1/2" HHCS



CAGE PLATE / RING GEAR ASSEMBLY

ASSEMBLY NO. 22023-01

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		01/15/07
REV. #	LOG #	DATE

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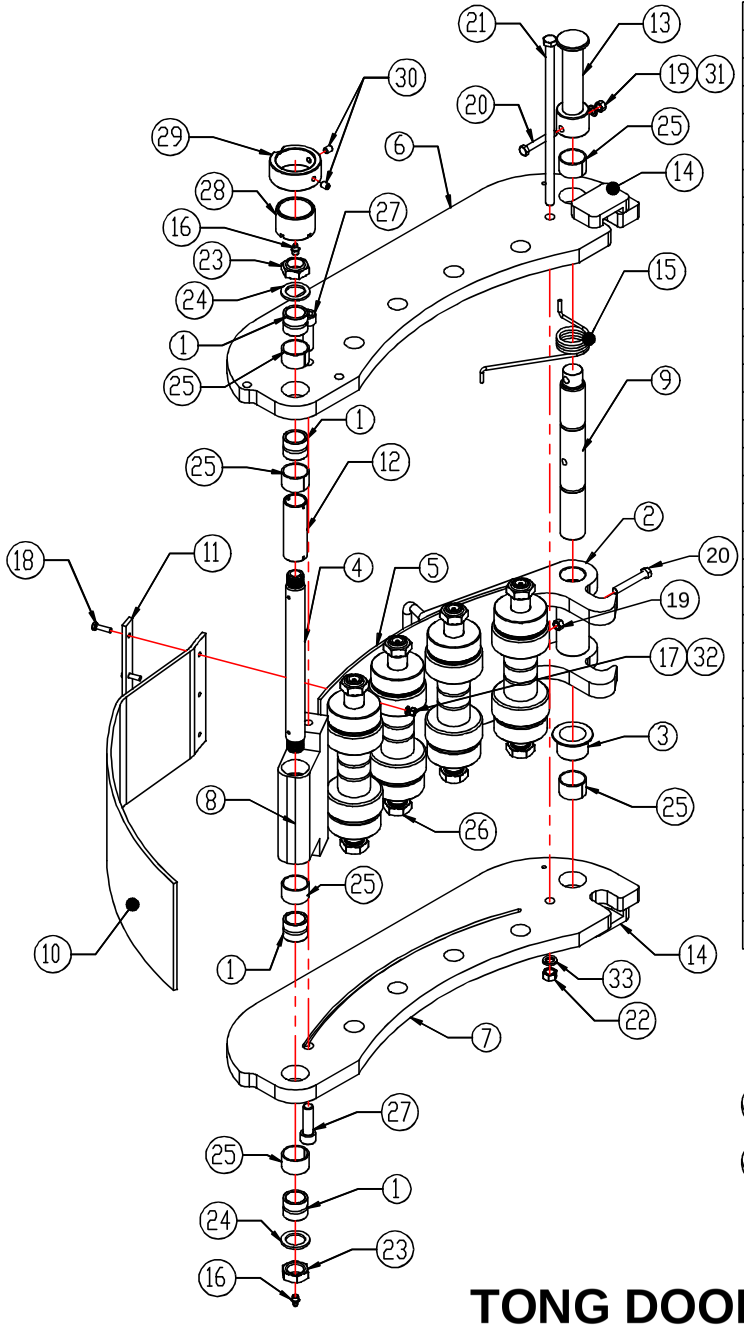
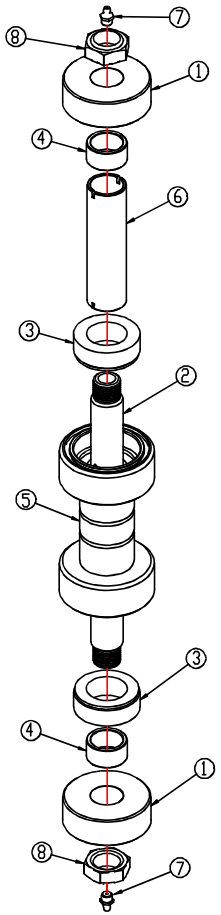
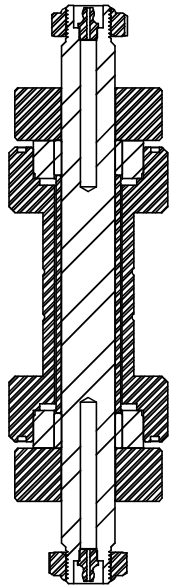
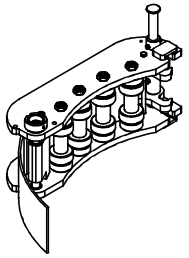


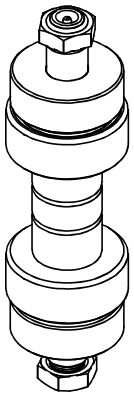
Item #	Qty.	Part Number	Part Name
1	4	14679	DOOR PIVOT BUSHING
2	1	14681	DOOR LATCH WELDMENT
3	1	22027-01	DOOR BUSHING
4	1	22057	DOOR PIVOT SHAFT
5	1	22680-S1	DOOR COVER
6	1	22680-S2T	TOP TONG DOOR PLATE
7	1	22680-S2B	BOTTOM TONG DOOR PLATE
8	1	22680-S5	HINGE
9	1	22682	DOOR LATCH PIVOT PIN
10	1	26680-S3	RUBBER GUARD
11	1	26680-S4	SUPPORT STRIP
12	1	26680-S6	DOOR HINGE SPACER
13	1	26680-S10	DOOR PIVOT PIN PROTECTOR
14	2	26680-S12	DOOR LATCH PIN DOUBLER
15	1	SMH1501-N	TORSION SPRING
16	2	1001	1/8 NPT ZERT
17	3	100	1/4"-20 HEX NUT GR8
18	3	105	1/4"-20 X 1" HHCS GR8
19	2	1024	3/8-16 NUT
20	2	1060	3/8-16 x 2 1/2 HHCS
21	1	1133	1/2"-13 X 12" HHCS
22	1	1101	1/2-13 NUT
23	2	1213	1"-12 LOW PROFILE NYLOCK NUT
24	2	2040	DOOR BUSHING
25	6	2021	1 1/2 x 1 DU BEARING
26	4	22675	DOOR DUMBELL ROLLER ASSEMBLY
27	2	1155	5/8"-11 X 2" SHCS
28	1	76113-S5	DOOR SWITCH COLLAR
29	1	76131	DOOR SWITCH ADJ. SLEEVE
30	2	1029	3/8"-16 X 1/2" SET SCREW
31	1	1027	WASHER, LOCK 3/8"
32	3	101	1/4" LOCKWASHER
33	1	1103	1/2" LOCKWASHER





SECTION A-A





DOOR DUMBELL ROLLER ASSEMBLY NO. 22675

Item #	Qty.	Part Number	Part Name
5.1	2	22676	DOOR ROLLER SPACER
5.2	1	22677	DOOR DUMBELL SHAFT
5.3	2	55191	DUMBELL ROLLER BUSHING
5.4	2	55192	DUMBELL ROLLER SPACER
5.5	1	14308	DOOR DUMBELL ROLLER
5.6	1	73071	DUMBELL ROLLER SPACER
5.7	2	1001	1/8 NPT ZERT
5.8	2	1213	1"-12 LOW PROFILE NYLOCK NUT

TONG DOOR ASSEMBLY

ASSEMBLY NO. 22680

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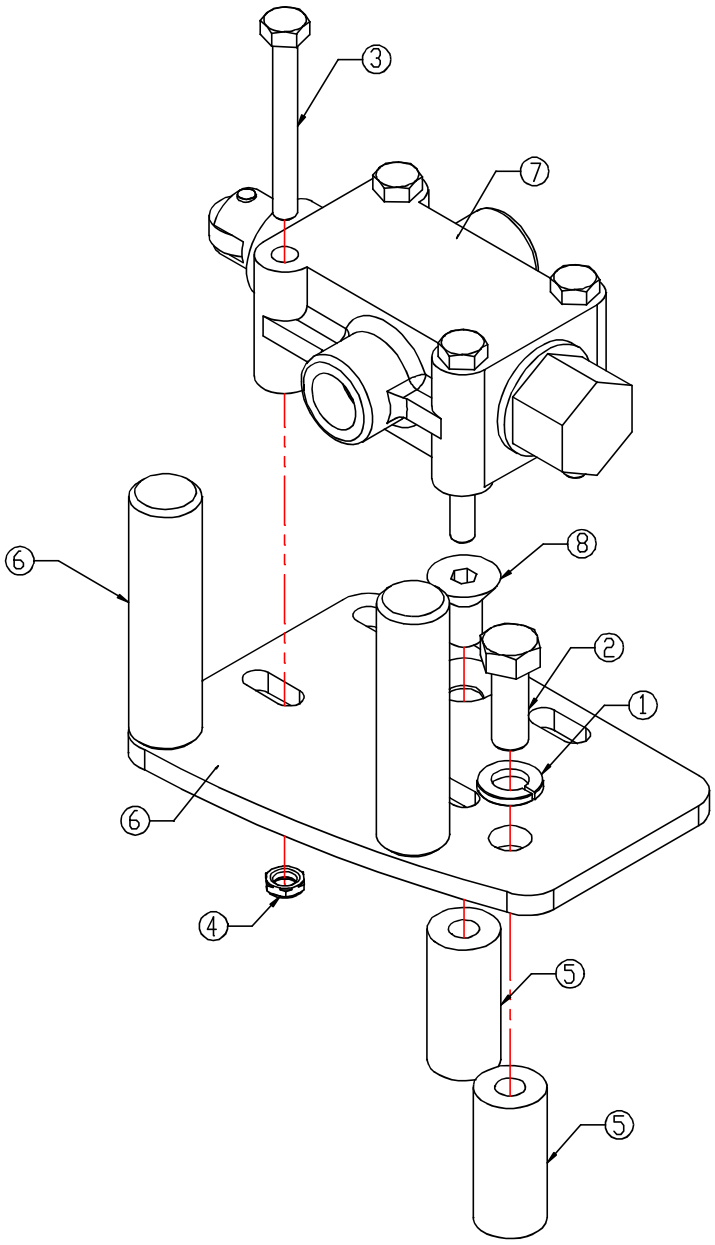
		01/15/07
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-05\22680 Door.wpg

Item #	Qty.	Part Number	Part Name
1	1	1027	WASHER, LOCK 3/8"
2	1	1047	3/8"-16 X 1" HHCS
3	4	110	1/4"-20 X 2 1/4" HHCS
4	4	212	1/4-20 NYLOCK NUT
5	2	45067-S7	DOOR SWITCH BASE MOUNT
6	1	76128-3	BACKUP SENSOR MOUNT WELDMENT
7	1	SLV1000-01	NC SELF LUBRICATED VALVE-NORMALLY CLOSED
8	1	1042-A	SHCS FLAT - 3/8"-16 X 3/4"



DOOR VALVE ASSEMBLY

ASSEMBLY NO. 26681-01

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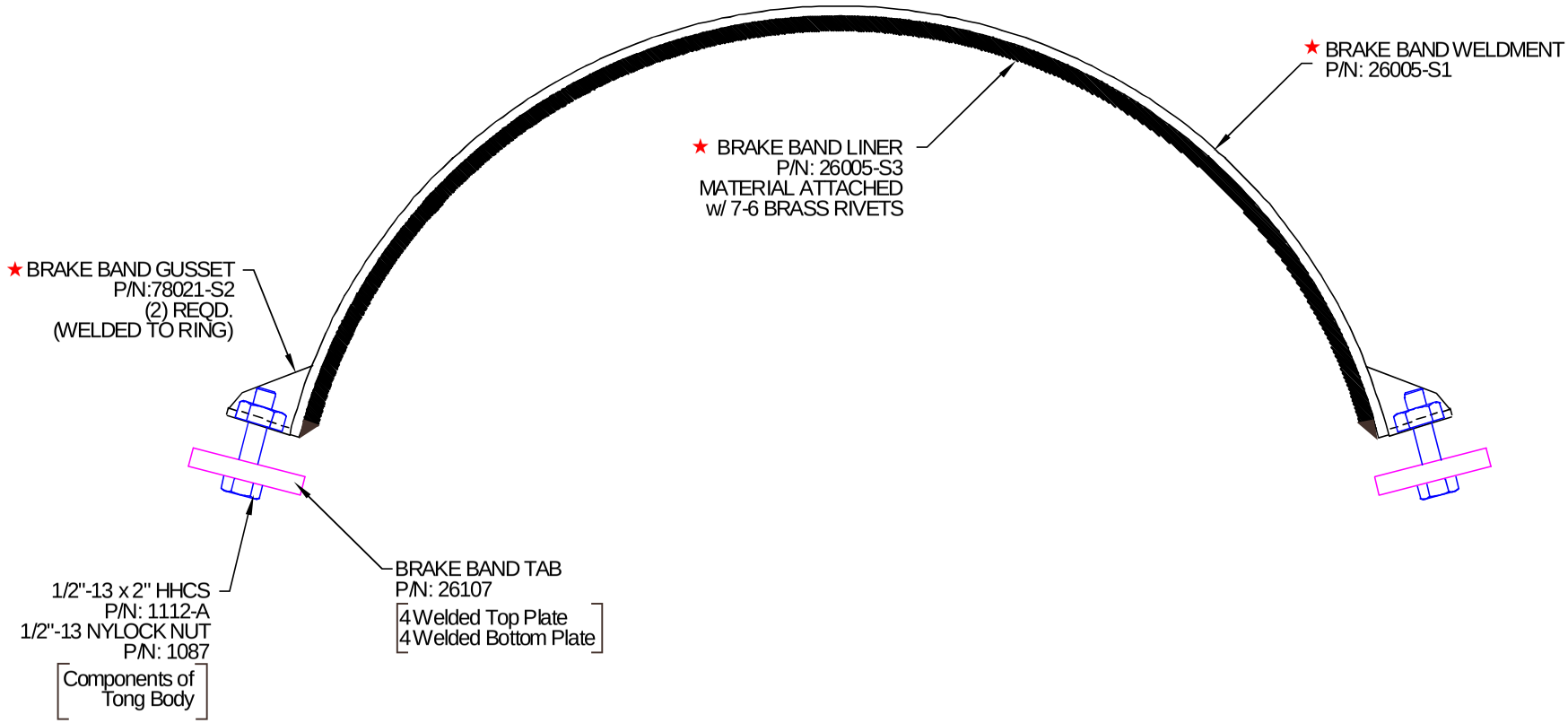
		01/15/07
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-05\26681-01 Door Valve wpg



BRAKE BAND ASSEMBLY

WELDMENT NO. 26005 ★
(2) REQD. TOP PLATE
(2) REQD. BOTTOM PLATE

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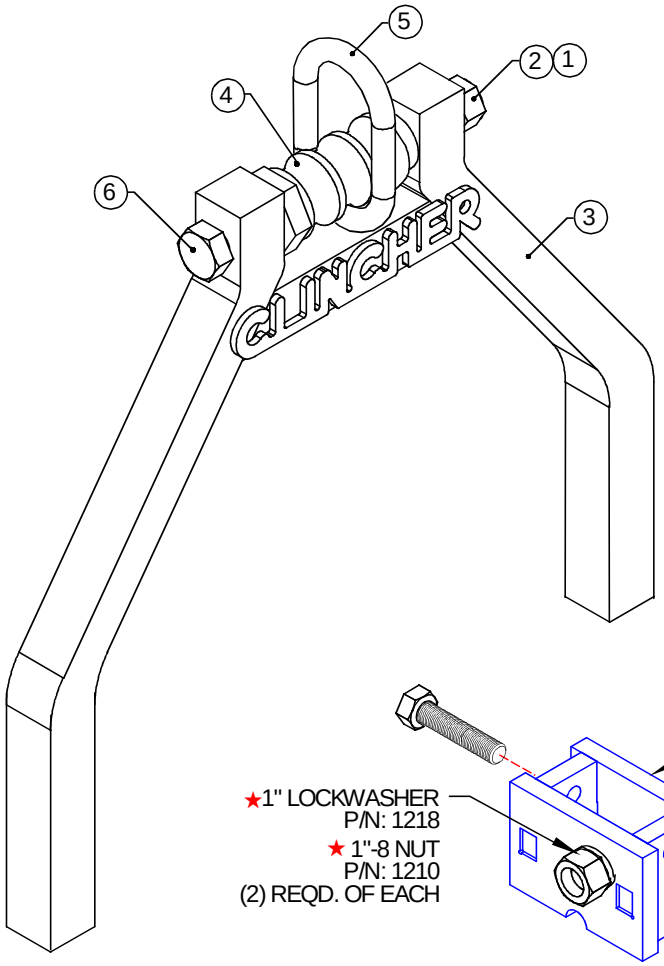
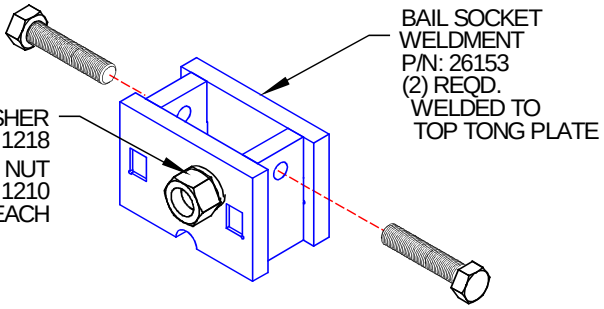
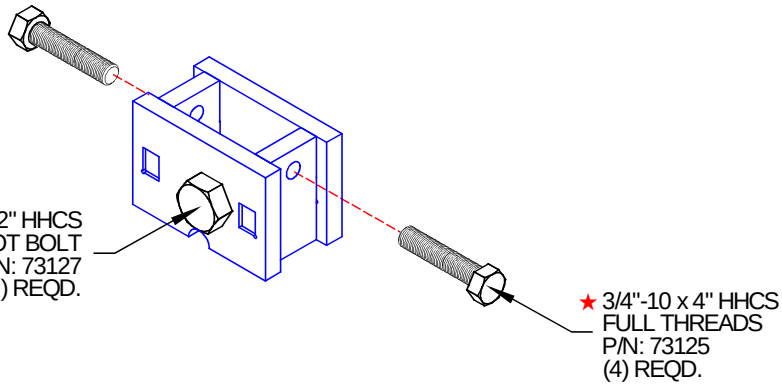
REV. #	LOG #	DATE
1		10/18/06

REF: P:\Manuals\Equip Manuals\Dwgs\CLE26000\Brake Band rev1.wpg

Item #	Qty.	Part Number	Part Name
1	1	1210	1"-8 NC HEX NUT
2	1	1218	1" LOCKWASHER
3	1	26727	BAIL WELDMENT
4	1	73117	BAIL ADJUSTMENT ROLLER
5	1	73118	1" x 2 TON MASTER LINK
6	1	73126	1"-8 x 12" HHCS GR.8







★ COMPONENTS OF TONG ASSEMBLY

BAIL ASSEMBLY

ASSEMBLY NUMBER 26728

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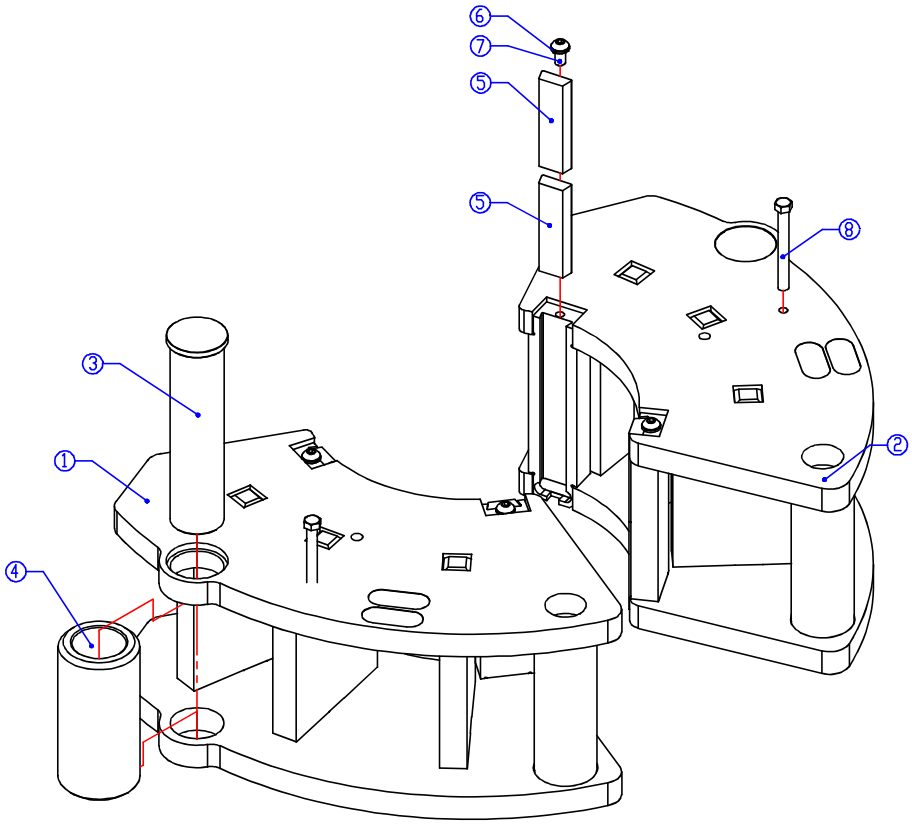
		01/08/07
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-04\26728 Bail.wpg

Item #	Qty.	Part Number	Description
1	1	SEE CHART	LEFT DOVETAIL JAW WELDMENT
2	1	SEE CHART	RIGHT DOVETAIL JAW WELDMENT
3	2	14666	JAW PIN
4	2	14667	JAW ROLLER
5	8	DTI1601	1/2" x 1 1/4" x 3 7/8" DOVETAIL INSERT
6	4	1027	3/8" LOCK WASHER
7	4	1061	3/8"-16 x 3/4" BUTTON HEAD CAP SCREW
8	2	1071	3/8"-16 x 3 1/2" HHCS

Size	*Jaw Set Assembly Number*	*Left Jaw Weldment Part Number*	*Right Jaw Weldment Part Number*	*Approx. Weight*
10 3/4"	CJDT22-10750	22-10750-L	22-10750-R	269
11 7/8"	CJDT22-11875	22-11875-L	22-11875-R	263
13 3/8"	CJDT22-13375	22-13375-L	22-13375-R	TBA
13 5/8"	CJDT22-13625	22-13625-L	22-13625-R	247
14"	CJDT22-14000	22-14000-L	22-14000-R	244
16"	CJDT22-16000	22-16000-L	22-16000-R	219
18"	CJDT22-18000	22-18000-L	22-18000-R	192
18 5/8"	CJDT22-18625	22-18625-L	22-18625-R	187
20"	CJDT22-20000	22-20000-L	22-20000-R	TBA
22"	CJDT22-22000	22-22000-L	22-22000-R	148



DOVETAIL JAW SET ASSEMBLY

SEE CHART FOR ASSEMBLY NUMBERS

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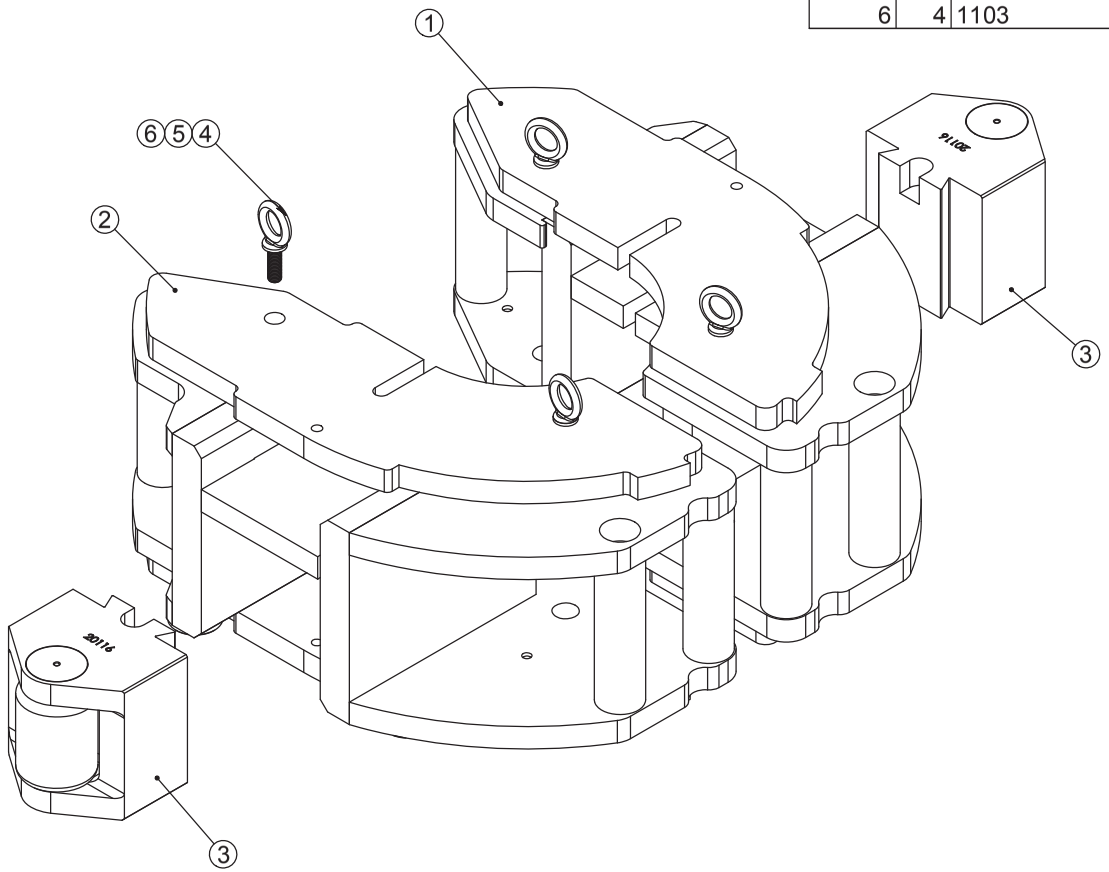
		01/15/07
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE22000XHT-05\Jaws CJDT22.wpg

Item #	Qty.	Part Number	Part Name
1	1	22110	LEFT COMBO JAW ADAPTOR
2	1	22112	RIGHT COMBO JAW ADAPTOR
3	2	20115	COMBO JAW PUSHER ASSEMBLY
4	4	BUCT7631	1/2 x 1 1/2 FORGED EYE BOLT
5	4	1101	NUT, HEX, 1/2-13
6	4	1103	1/2" LOCKWASHER



22” COMBO JAW ADAPTOR ASSEMBLY

ASSEMBLY NO. 2211

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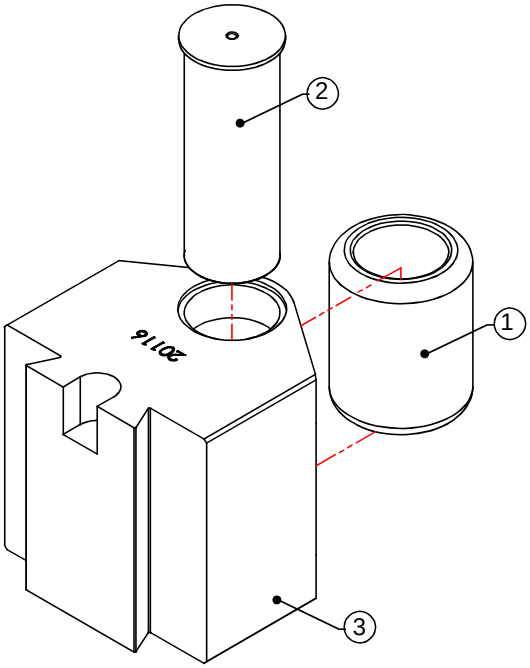
REV. #	LOG #	DATE

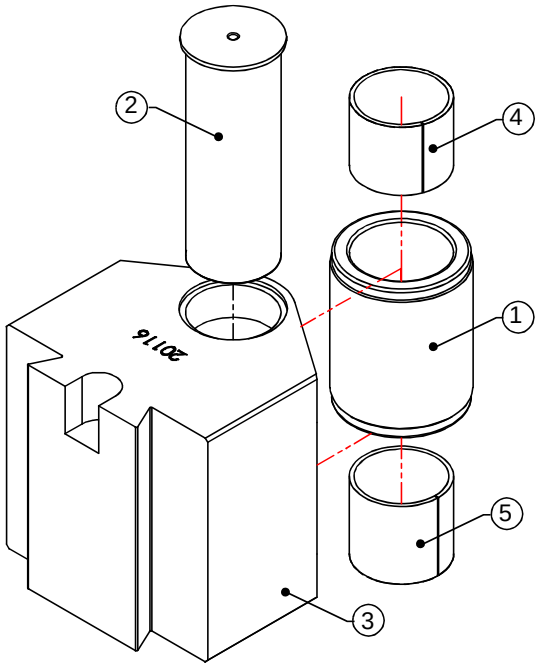
Item #	Qty.	Part Number	Description
1	1	73012-01	JAW ROLLER
2	1	73013-01	JAW PIN
3	1	20116	20" COMBO TONG JAW PUSHER



COMBO JAW PUSHER ASSEMBLY

ASSEMBLY NO. 20115

Item #	Qty.	Part Number	Description
1	1	73012-02	LOW FRICTION JAW ROLLER
2	1	73013-01	JAW PIN
3	1	20116	20" COMBO TONG JAW PUSHER
4	1	32DU28	2" x 1 3/4" DU BEARING
5	1	32DU32	2" x 2" DU BEARING



LOW FRICTION COMBO JAW PUSHER ASSEMBLY

ASSEMBLY NO. 20115-LF

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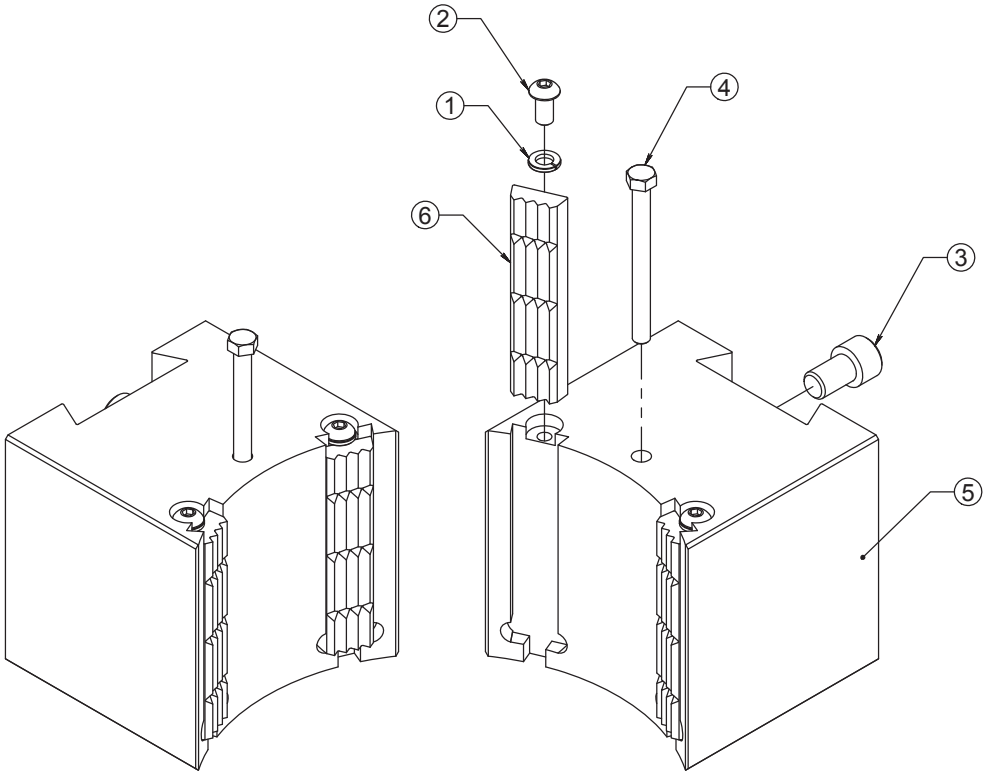
		08/24/05
REV. #	LOG #	DATE

REF: P:\Manuals\Equip Manuals\Dwgs\CLE20000XHT-01\20115 & LF.wpg

Item #	Qty.	Part Number	Part Name
1	4	1027	WASHER, LOCK 3/8"
2	4	1061	3/8"-16 X 3/4" BUTTON HD CS
3	2	1153	5/8"-11 X 1" SHCS
4	2	148	3/8"-16 x 4" HHCS
5	2	22117-09875	22 X 9.875 DOVETAIL X DOVETAIL TONG JAW
6	4	DTI1602	DOVETAIL STRIP DIE (1 1/4" x 1/2" x 5")



22” COMBO JAW ASSEMBLY

ASSEMBLY NO. 22117-09875A

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REV. #	LOG #	DATE

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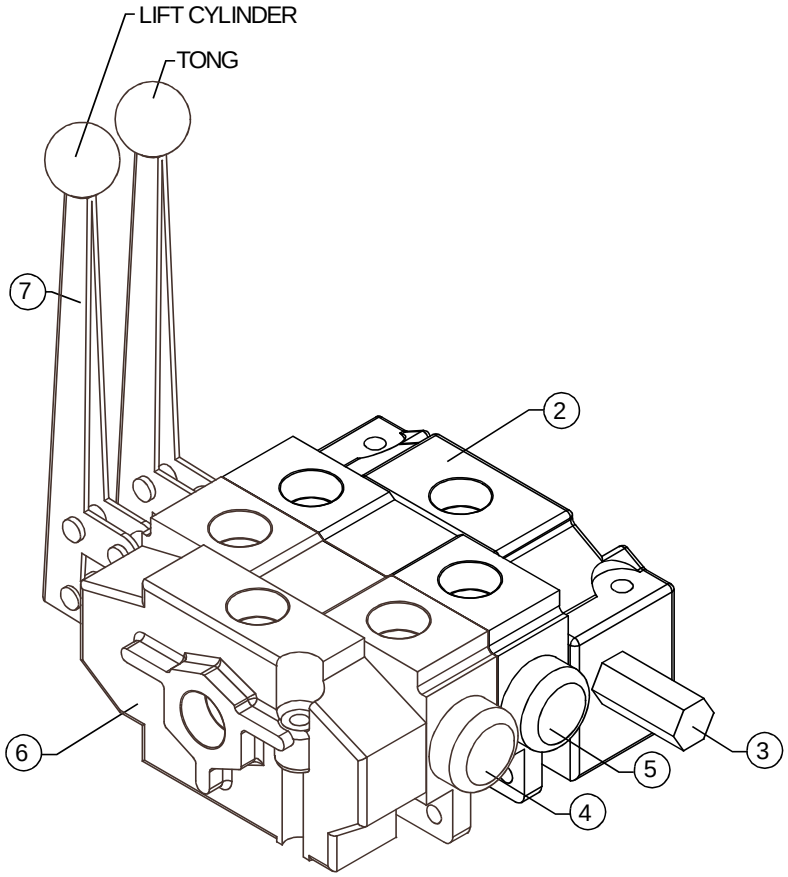
A35 VALVE BANK ASSEMBLY

Item #	Qty.	Part Number	Description
1	- -	- - - - -	- - - - -
2	1	VA35-AA440	INLET VALVE W/O RELIEF
3	1	DVG35-HMRV ⟨1⟩	RELIEF CARTRIDGE
4	1	VA35-DA4	WORK SECTION
5	1	VA35-MA4	WORK SECTION
6	1	VA35-TR55	OUTLET SECTION
7	2	A35-V1526K-8	A35 8" HANDLE



VALVE BANK ASSEMBLY

Rev.	Date	Description
1	08/19/05	Item 3 - Chg.PN from A35-MRV-1 to DVG35-HMRV; ECN#05-0064.

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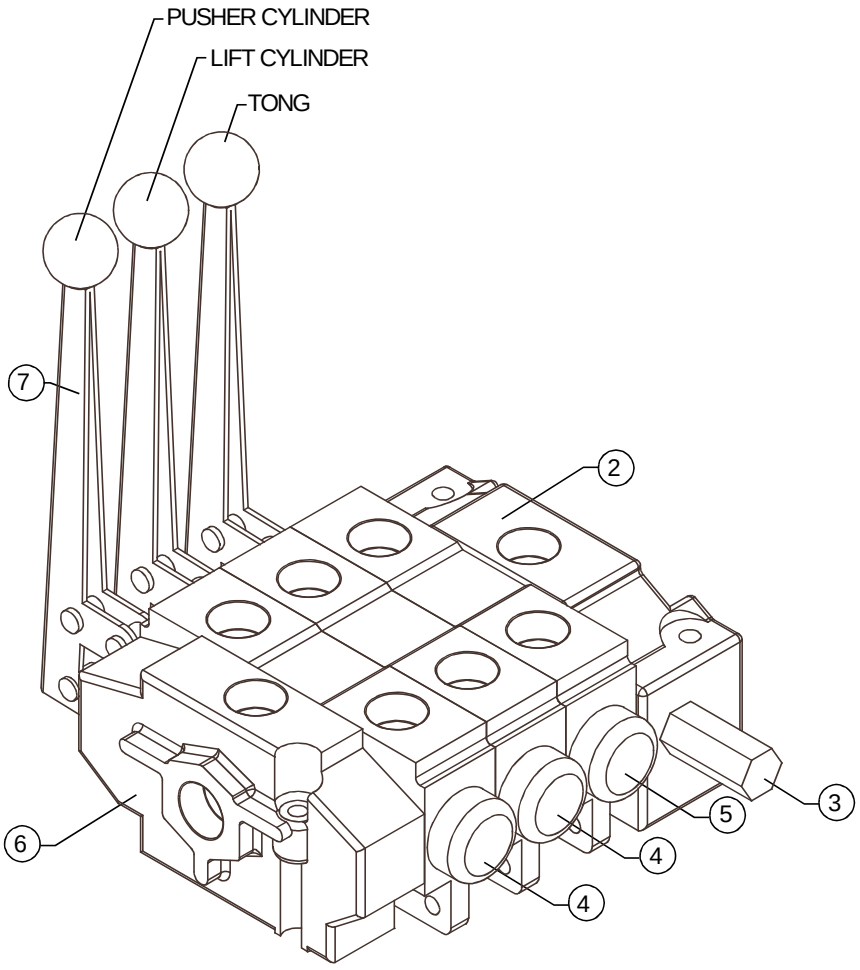
REV. #	LOG #	DATE
1		08/22/05

REF: P:\Manuals\Equip Manuals\Dwgs\CLE26000\Valve Bank rev1.wpg

A35 VALVE BANK ASSEMBLY

Item #	Qty.	Part Number	Description
1	- -	- - - - -	- - - - -
2	1	VA35-AA440	INLET VALVE W/O RELIEF
3	1	PVG35-HMRV ⟨1⟩	RELIEF CARTRIDGE
4	2	VA35-DA4	WORK SECTION
5	1	VA35-MA4	WORK SECTION
6	1	VA35-TR55	OUTLET SECTION
7	3	A35-V1526K-8	A35 8" HANDLE



Rev.	Date	Description
1	08/19/05	Item 3 - Chg.PN from A35-MRV-1 to DVG35-HMRV; ECN#05-0064.

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VALVE BANK ASSEMBLY

OPTIONAL PUSHER CYLINDER VALVE

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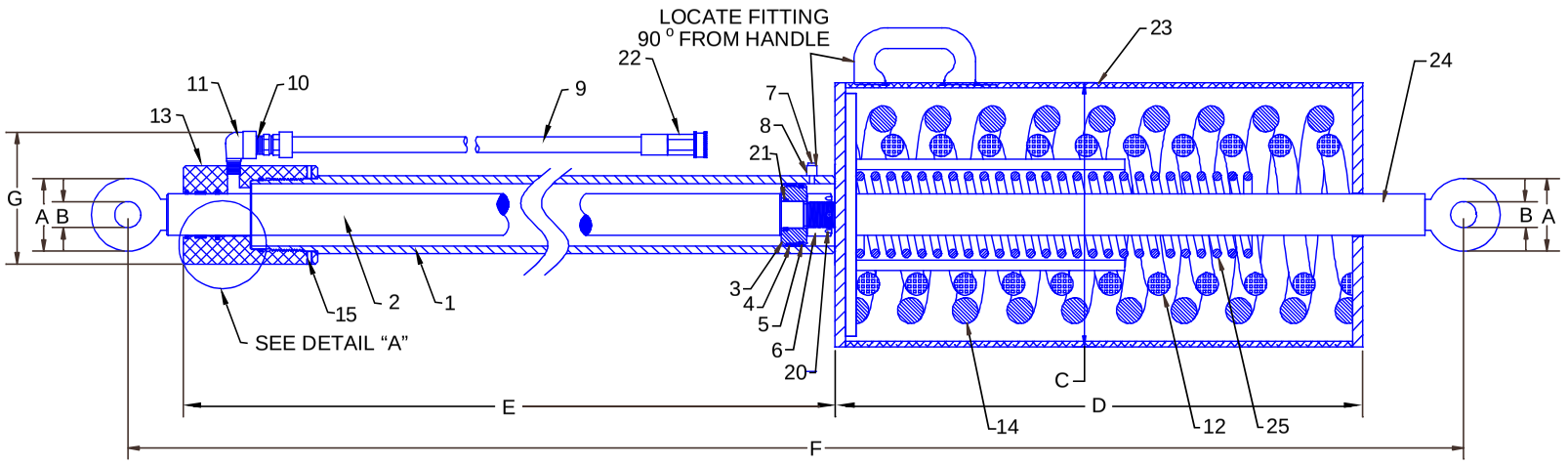
REV. #	LOG #	DATE
1		08/22/05

REF: P:\Manuals\Equip Manuals\Dwgs\CLE30000\Valve Bank rev1.wpg

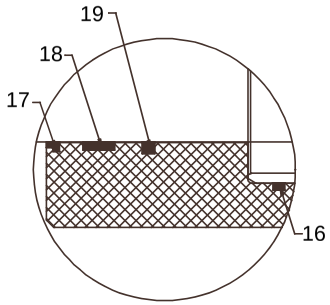


DIMENSIONAL DATA
A: 3 1/2" x 3/4"
B: 1 1/4"
C: 12 3/4"
D: 25 1/2"
E: 41 1/2"
F: 74.550"
G: 6 3/8"

i SEAL KIT P/N: ASAP300

BILL OF MATERIALS

	Item	Qty.	Description	P/N
	1	1	HYD/AIR CYLINDER BARREL	LCR122
	2	1	CYLINDER ROD WELDMENT	LCR118
	3	1	PISTON	LCR121
i	4	1	WEARBAND	W30000500
i	5	1	POLYPACK 2 5/8" x 3" x 3/16"	18702625
	6	1	1 1/4"-12 SLOTTED NUT	1381
	7	1	1/2" NPT FLUSH PLUG W/ 1/8" ORIFICE	1657
	8	1	1/2" HALF COLLAR	1380
	9	1	1/2" x 120" HOSE ASSY. MNPT x FJIC SWVL	LCR107-A
	10	1	3/8" MNPT x 1/2" MJIC STR. ADAPTER	1466
	11	1	3/8" MOD. STREET EL W/ORIFICE	LCR109
	12	1	LIFT CYLINDER SPRING	SMH2000
	13	1	GLAND	LCR123
	14	1	LIFT CYLINDER SPRING	SMH2001
	15	2	1/4"-20 x 1/2" SET SCREW	1019
i	16	1	O RING 3 3/8"ID, 3 5/8"OD, 1/8"W	2-237
i	17	1	WIPER	959-21
i	18	1	WEARBAND	W22500500
i	19	1	POLYPACK 2" x 2 3/8" x 3/16"	18702000
	20	1	1/4" x 2" ROLL PIN	1009B
i	21	1	O RING 1 1/4"ID, 1 1/2"OD, 1/8"W	2-218
	22	1	QUICK DISCONNECT 1/2" FEMALE SNAPTITE	1430
	23	1	SPRING HOUSING ASSEMBLY	LCR501
	24	1	COMPRESSION ROD WELDMENT	LCR601
	25	1	LIFT CYLINDER SPRING	SMH1501-A



DETAIL "A"
SCALE: 3X

SPECIFICATIONS

MAXIMUM SPRING TRAVEL (PRELOAD TO STOP TUBE) ..... 11 in.

MAXIMUM ALLOWABLE STATIC LOAD (WITH 3.5" SPRING COMPRESSION STILL AVAILABLE) ..... 8,500 lbs.

MAXIMUM ALLOWABLE LOAD (SPRING FULLY COMPRESSED TO STOP TUBE) ..... 15,800 lbs.

PRESSURE REQUIRED TO LIFT MAXIMUM ALLOWABLE LOAD ..... 2,500 psi

MAXIMUM ALLOWABLE INTERNAL PRESSURE ..... 3,000 psi

CYLINDER I.D. ..... 3 in.

ROD O.D. ..... 2 in.

STROKE ..... 35.640 in.

LIFT CYLINDER ASSEMBLY

ASSEMBLY NUMBER LCR600

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		07/23/03
REV. #	LOG #	DATE

REF: S:\Equip Manuals\Dwgs\LCR\LCR600.wpg

SECTION 11 CLINCHER® LOAD CELL AND TORQUE GAUGE ASSEMBLIES

The **CLINCHER®** Tong and Backup are available in versions which accommodate compression load cells or tension style load cells. All information contained in this Technical Manual refers to products which utilize tension style load cells. Contact SUPERIOR for information concerning products using compression load cells.

Part Number	SM100-52-T
Torque Rating	100,000 ft lbs
Handle Length	52 inches
Loadcell Type	Tension
Loadcell Manufacturer	SUPERIOR MANUFACTURING & HYDRAULICS
Loadcell Part Number	CLC200
Torque Gauge Mfr.	TOTCO or equivalent
Torque Gauge Size	6"
Gauge Mount	“L” Bracket
Hose Length	6 ft.
Assembly Documentation	Calibration Certificate

CLINCHER® Load cells and Torque Gauges are produced by several manufacturers. The information provided by MD TOTCO or Acadiana Oilfield Instruments may not be applicable to all torque gauges or load cells. This reference information is provided with the permission of MD TOTCO and Acadiana Oilfield Instruments.

SECTION 11 CLINCHER® LOAD CELL AND TORQUE GAUGE ASSEMBLIES

To request copy of Acadiana Oilfield Instruments Tong Torque System Technical Manual TM518, please contact:

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4225 Hwy. 90 East
Broussard, LA 70518
Phone: 337-837-8847
Fax: 337-837-8839
www.superior-manf.com

SECTION 12 MOTOR SERVICE MANUALS

To request copy of Rineer Motor Service Manuals, please contact:

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Broussard, LA 70518
Phone: 337-837-8847
Fax: 337-837-8839
www.superior-manf.com

SECTION 13 VALVE TECHNICAL DATA

To request copy of Valve Technical Data, please contact:

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